Chemical Week

April 21, 1956

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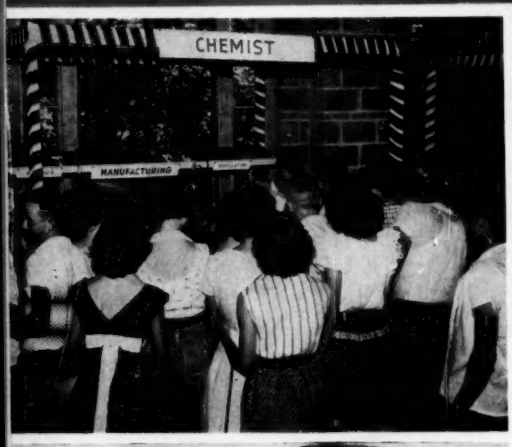

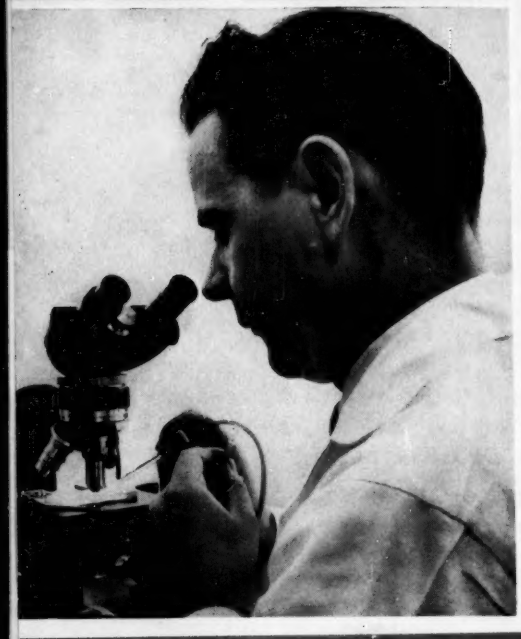

Credit is tight and getting tighter. Here's why and what it will mean to you . . . . . p. 18

The high school set: target of Chemical Progress Week's career counsellors . . . . . p. 25

Competition in masonry paints quickens as producers launch a bevy of new products . . . . p. 46

It's smart to help distributors, says Dow's Koch. How? By a distributor development program . . . . p. 72

Bio-insecticide researcher: He's training viruses to be insect killers . . . . . p. 80

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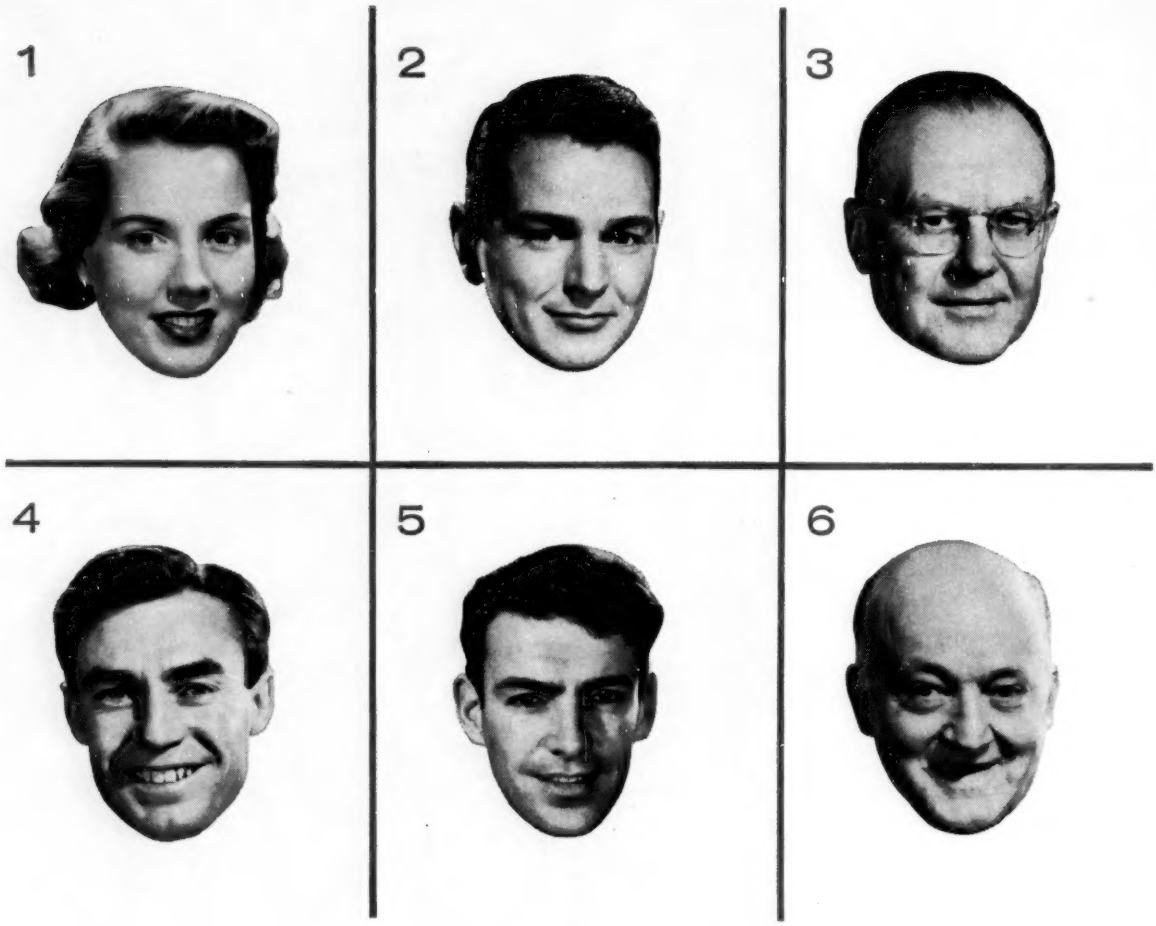

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CHEMICAL PROGRESS WEEK-APRIL 23-28

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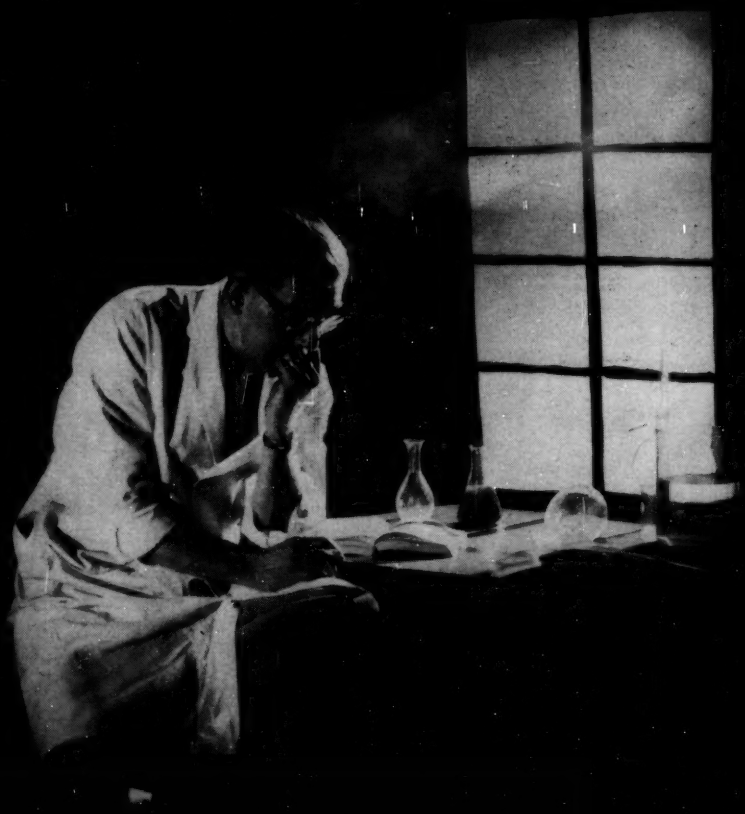

just thinking

Chemical progress is autoclaves, test tubes, distillation towers . . . hydrocarbons, heterocyclic compounds . . . processes, polymerizations, products.

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Chemical Progress Week, April 23-28

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Chemical Week

TOP OF THE WEEK

April 21, 1956

American Cyanamid will double Fortier, La., acrylonitrile capacity. Here's why there's new interest in acrylates—why Dow has plans in the same direction p. 21

First dry bleach to go into national distribution will hit dealers' shelves next month .....p. 48

Gas chromatographs prepare to take rapid gas analysis from laboratory to production line .....p. 64

Phosphorus trichloride output rocketed to a record 31 million lbs. last year. Puzzler: What's ahead in '56? p. 94

9 BUSINESS NEWSLETTER

12 OPINION

14 UPCOMING DATES

18 BUSINESS NEWS
Rising interest rates on borrowed money will soon be felt by chemical firms.

20 Du Pont tells the Internal Revenue Service why pension trusts should be kept tax-exempt

22 WASHINGTON ANGLES

25 ADMINISTRATION
For future 'chemical progress,' CPW show in South seeks to line up youthful talent

26 Break for growth companies: compromise may end clash over corporate engineering practice

28 U. S. firms building in Mexico to hang onto lead over European, Japanese rivals

30 Chemical plants unscathed as 2 Texas towns call off series of attempted annexations

41 CHARTING BUSINESS

46 SPECIALTIES
New coatings may tempt reluctant masonry painters

50 Here are details of new low-cost cold-fill aerosol line

59 TECHNOLOGY NEWSLETTER

64 PRODUCTION

66 First continuous process for refining pine sap turns out high-quality rosin

72 DISTRIBUTION

73 Wyeth answers publicity criticism

74 New ideas—and in copious quantities—spark National Packaging Show

80 RESEARCH
Microbes may soon vie with chemicals for insecticide service

84 Upjohn unveils newest, most potent male hormone

91 MARKET NEWSLETTER

94 MARKETS

MEET

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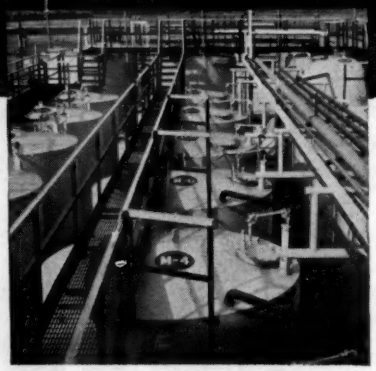

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Chemical Week

April 21, 1956 *Vol. 78, No. 16*

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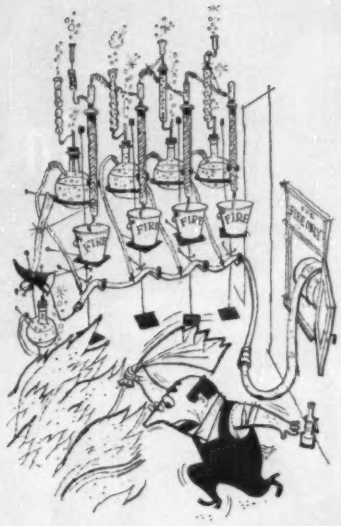

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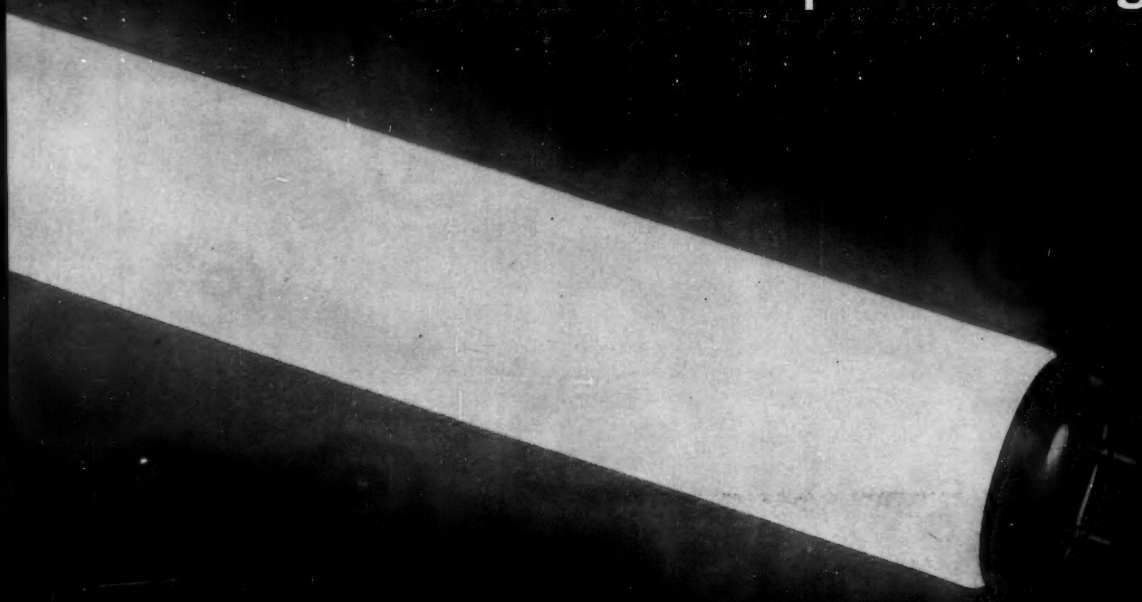

The ability of Mallinckrodt research and production chemists to control purity, maintain uniformity from the pilot plant through the production plant stages has played an important part in the growth of the electronics industry. This is particularly true of chemicals needed to manufacture phosphors for *fluorescent lamps*.

The year 1938 marked the advent of the first commercial fluorescent lamp. Production in 1945 was 37 million fluorescent lamps. During the last four years it has averaged over 90 million per year.

At the inception, the average life rating of a fluorescent lamp was only 100 hours . . . efficiency was extremely low. By 1948 life rating had been increased to approximately 3000 hours, but the efficiency drop was as much as 40% after only 1000 hours.

The problem: ***manufacturing the proper halo-phosphate phosphors.***

The pure *calcium phosphate dibasic* needed was not commercially available. The industry called on Mallinckrodt whose experienced technical staff produced laboratory samples in a matter of days. Large-scale factory production was underway within a month after laboratory samples were approved.

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Ammonium Bifluoride
Ammonium Carbonate
Ammonium Phosphate Dibasic

BARIUM
Barium Acetate
Barium Carbonate
Barium Chloride
Barium Nitrate

CADMIUM
Cadmium Chloride
Cadmium Nitrate
Cadmium Sulfate

CALCIUM
Calcium Carbonate
Calcium Chloride
Calcium Fluoride
Calcium Nitrate
Calcium Phosphate Dibasic

COPPER
Cupric Sulfate
Cuprous Chloride

LITHIUM
Lithium Carbonate
Lithium Chloride
Lithium Sulfate

MAGNESIUM
Magnesium Carbonate
Magnesium Oxide

MANGANESE
Manganese Carbonate
Manganese Sulfate

MERCURY
Mercury Metal
Mercuric Oxide

NICKEL
Nickel Nitrate

POTASSIUM
Potassium Cyanide
Potassium Dichromate

SILICA
Silicic Acid

SILVER
Silver Cyanide
Silver Nitrate
Silver Oxide

SODIUM
Sodium Carbonate
Sodium Dichromate
Sodium Hydroxide

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Benzene
Carbon Tetrachloride
Chloroform
Ether
Ethyl Acetate
Isopropyl Alcohol
Methyl Alcohol
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Business
Newsletter

CHEMICAL WEEK
April 21, 1956

The problem for business this year may be more one of inflation than deflation and recession.

You see it first in the pressure for an immediate $12-$15/ton boost in the price of steel. Spokesmen for several major steel makers have now advocated such a boost.

First came National Steel's E. T. Weir; then Republic's Charles White pointed out the need for price boosts to meet the industry's billion-dollar-a-year expansion program. And last Thursday the voice of Pittsburgh Steel's Avery Adams was added. Such a rise, he said, would "bring the steel industry's return on investment to a level equal to that of leading companies in other industries."

Look second at the credit situation (*see page 18*). Note that the Federal Reserve Board's decision to raise the rate at which it lends money to banks puts such rates at the highest they've been since 1933.

But it's the military spending situation that may ignite the inflation powder-keg.

Every inflationary move for the past 15 years—and there wasn't much inflation for some years before that—has had some relation to an increase in the defense program. And this is still the area where spending can put real pressure on prices—fast.

Look especially hard at guided missiles, a projected $220-million chemical market by 1957 (*CW, April 7, p. 61*). The Pentagon was ready to increase spending for missiles and planes by $300 million in the coming fiscal year, but that figure has now been upped by an additional $375 million. And it's likely that defense spending on missiles and aircraft in the fiscal year that ends this June will be $100 million more than previously estimated.

But it's not only chemicals that are important here. The equipment and metal-working industries must be taken into account. A further step-up in aircraft and missiles contracts later this year, with heavy demands for new tooling and materials coming at a time when new auto models may be catching the public fancy, is likely to slow deliveries on some types of chemical processes equipment—or, at least, boost prices. And with prices sure to go up on structural steel shapes, new plant costs will be up.

If these upturns come just as industry is catching the effects of a strike or a price increase for steel, then you can really start talking about inflation.

The critical period will be early fall. That looks like the time when the crests of all three waves will coincide. Until then, expect calm and prosperous business seas.

•

The week's earnings reports underline this prosperity.

Hercules Powder's sales of $57 million and earnings per share of 55¢ for the first quarter were both up 8%.

Dow's earnings for the three months ending Feb. 29 were $14 million, up 38%, on sales of $138 million, up 21%.

Koppers' quarterly sales of $69 million were up 49%; its profits rose 98%, $3.7 million.

General Aniline, showing an 8% increase in sales, to $31 million, had a 90% boost in profits—$1.45 million for the quarter.

Business Newsletter

(Continued)

Diamond Alkali, whose $30 million in sales were 22% more than '55's first quarter, reported $2.8 million in profits—a boost of 66%.

But some failed to show such rises—

Rohm & Haas, with sales up 4%, to $40 million, saw profits off 0.4%, to $4.2 million for the quarter.

Du Pont's sales for the quarter were $459 million, down 3%, its profits, "somewhat below" those of '55.

•

Considering an expansion in the Southeast: American Cyanamid (*see page 21*). It has asked the Savannah, Ga., city government to double the supply of water available to the firm. Cyanamid uses its Savannah location to make titanium dioxide.

•

Last weekend's Alabama tornadoes had little effect on chemical company operations. While downtown Huntsville received some damage, Rohm & Haas-operated facilities at nearby Redstone Arsenal were untouched. Also unscathed: Reichhold's Tuscaloosa plant and Monsanto's Anniston operations.

•

In Texas, a row involving Phillips Petroleum and the Southern Pacific railroad has stalled Phillips' plans for developing its 950-acre industrial site near the Houston Ship Channel. The railroad, which has a track 4,800 ft. east of the site, was not asked to serve it; Phillips wants to link the area with a belt rail line operated by the Port Terminal Railroad Assn. Now, SoPac has taken Phillips to court, asking an injunction against construction of such a spur by Phillips.

Celanese, which will build on the site, would be the first to be affected. Say Phillips officials: without rail facilities, Celanese "cannot and will not go forward with its construction program."

In brief—

•

Montecatini has informally asked listing of its stock on the New York Stock Exchange, but it hasn't wet submitted a formal application.

American Cyanamid this week formally acquired business and assets of The Formica Co. It will be operated as a wholly owned subsidiary.

Goodrich-Gulf will have its Institute, W. Va., rubber plant in production this week. And more than 75% of those working at the plant when it was mothballed three years ago are back on the job.

Schering Corp., Wall Street sources report, will earn $2/share for the first quarter of '56, compared with 34¢ last year. It's readying for market two new drugs, which it believes will contribute $30 million to its total sales this year.

What price publicity? A Chas. Pfizer stockholder, at Monday's annual meeting, proposed these five new members to the company board: Estes Kefauver, Thomas E. Dewey, Jonas Salk, Rowland Hughes and Alfred Gruenther. His reasoning: their election would give the company favorable publicity. The move was voted down.

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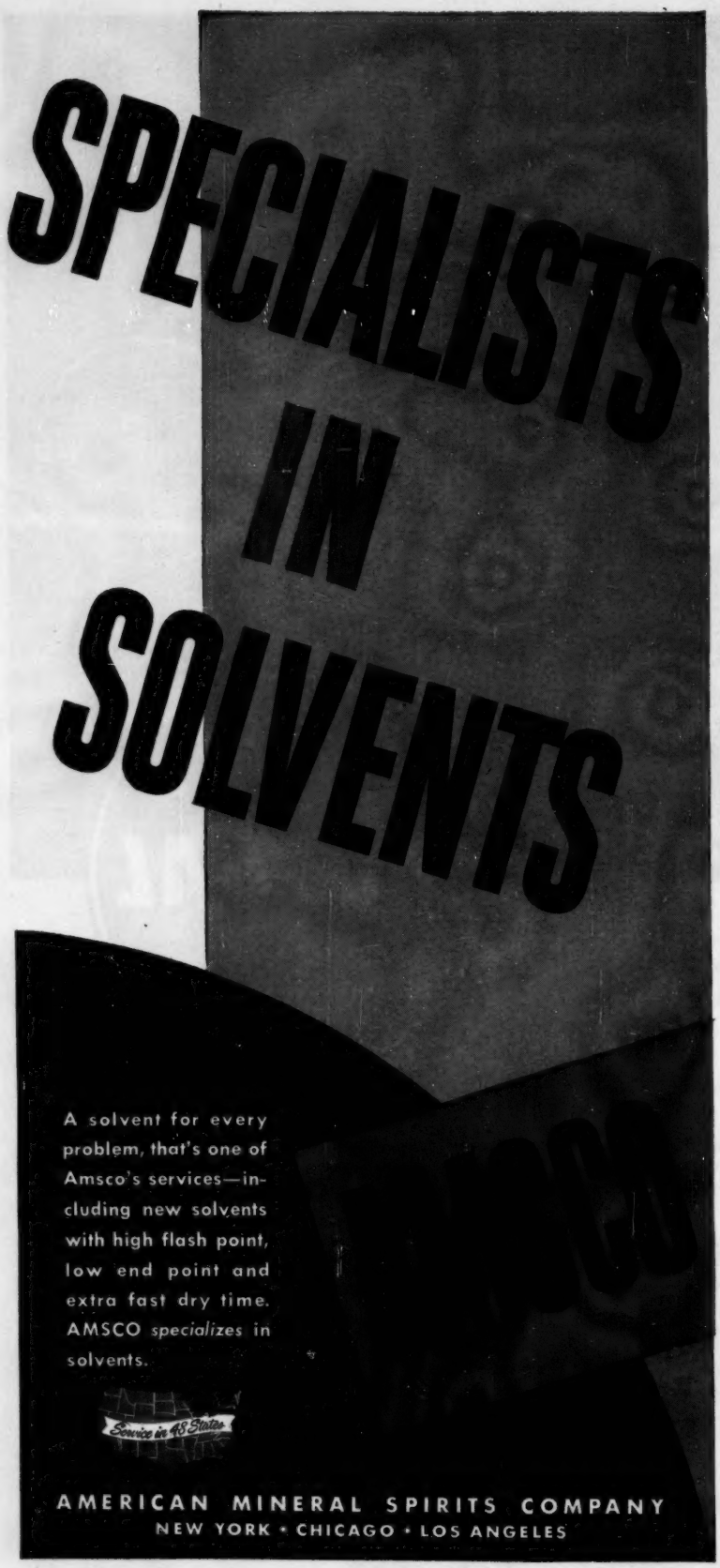
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OPINION . . .

Kind Hearts Are . . .

DEAR MR. KALINA: Your article on the Box Method (*March 31*) was . . . a beautiful job. You presented the story clearly and simply, pros as well as cons in capsule form, but the full story, nevertheless.

Since I have just come through the experience of trying to write about the Box Method in a way that would be clear and understandable, I have a new understanding of what goes into a CHEMICAL WEEK article. I also have a greatly increased respect—added to my already high degree of respect—for the writing skills of . . . the staff of CHEMICAL WEEK. . . .

MAYNARD S. RENNER
Dewey and Almy Chemical Co.
Cambridge, Mass,

. . . More than Coronets

DEAR MR. JOHNSON: . . . The article on commercial labs (*March 17*) reflects fairly the status and function of the independent laboratory. We like it, at least, and hope our optimism is well founded.

H. M. BLOCK
Vice-President
United States Testing Co
Hoboken, N. J.

Estimate Was Off

DEAR MR. JOHNSON: On page 20 of the March 31 issue you have a chart headed "Petroleum's Drive to Dominance" in which you show the curves on domestic light oil distillates—benzene, toluene, xylenes.

We wish to differ with your 1955 estimate on the production of the total of these products from coke-oven sources. The 1954 figures would show a drop from 1953, inasmuch as there was a considerable drop in coke-oven operations during 1954; however, this

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

trend was reversed in 1955 and as a consequence the coke ovens produced 174 million gal. of benzene, 38 million gal. of toluene, 11 million gal. of xylene, for a total of 223 million gal. rather than the approximate 150 million gal. shown in your chart. . . .

The basis of the figures we show above is the Mineral Industry Survey of the U.S. Bureau of Mines showing the full year's production for these commodities. . . .

We trust you will make the necessary corrections, inasmuch as the inference to be drawn from your chart is that the coke-oven supply of these products is dwindling and heading for extinction, which is far from the truth.

L. A. SCHLUETER
American Coke and Coal Chemicals Institute
Washington, D.C.

Reader Schlueter is quite right. We made our estimates before official figures were available.—ED.

Competition for 'Drys'

DEAR MR. JOHNSON: . . . We think you've made a very good analysis ["Will Dries Reshuffle the Lineup?" (*March 17*)] of the picture and have covered the subject thoroughly. Major competition to dry aerosols will undoubtedly come from the squeeze-type containers.

F. R. ZUMBRO
Du Pont Co.
Wilmington, Del.

Lilly Didn't Hire

DEAR MR. JOHNSON: CHEMICAL WEEK, which often threads its way safely through the banana peels of misinformation, slips in its March 10 issue.

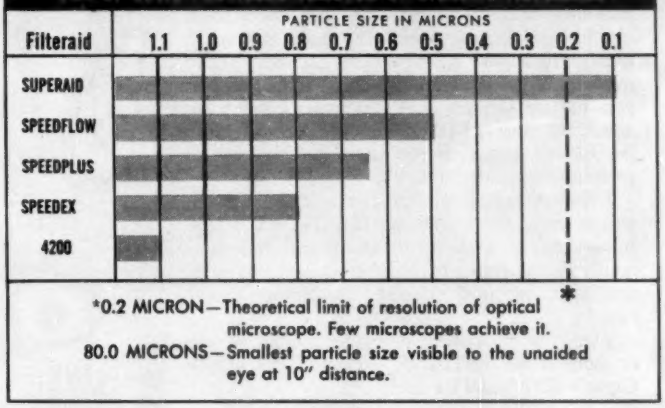
In a picture caption on page 18, the allegation is made that Eli Lilly and Company "hired a railroad car" to bring the House Interstate and Foreign Commerce Committee to Indianapolis because "congressmen, now that the federal government pays for Salk vaccine, are important chemical industry customers."

This allegation is wholly in error. Eli Lilly had nothing to do with the congressmen's transportation. They handled that and paid their hotel bills as well. CHEMICAL WEEK does an injustice to Chairman J. Percy Priest's

...With a DICALITE Filteraid

you can filter out particles so small you can't see them with a microscope!

SIZE OF SOLID PARTICLES REMOVED BY DICALITE FILTERAIDS



*0.2 MICRON—Theoretical limit of resolution of optical microscope. Few microscopes achieve it.
80.0 MICRONS—Smallest particle size visible to the unaided eye at 10" distance.

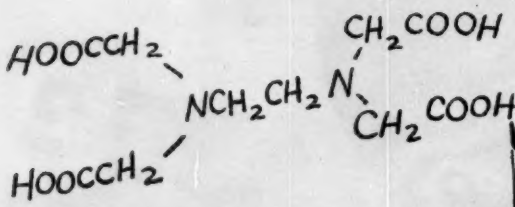
These figures, established in recent Dicalite laboratory tests, are, we believe, the first *accurate* figures ever published on the actual sizes of solids removed by different grades of diatomaceous filteraids. And the dependable uniformity of Dicalite filteraids, in all grades, assures you the same reliable performance, filter run after filter run, on all types of particulates, even gelatinous or slimy. The significance of these figures in pointing the way to the development of maximum filteraid performance can hardly be over-stated. They are one more evidence of Dicalite's leadership in the field of filteraids.

For more complete information on the application of Dicalite Filteraids to your processing problem, write

We Progress thru Service

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DIVISION • GREAT LAKES CARBON CORPORATION
612 SOUTH FLOWER STREET, LOS ANGELES 17, CALIFORNIA



FOR THE PUREST EDTA

USERS DEMAND

TETRINE®

SEQUESTERING AGENTS

Using the purest materials available has several advantages. In some processes, any foreign materials have harmful effects, and must be cut to an absolute minimum. And in all processes, extra purity gives more mileage—you get more active material for your money. This is why it will pay you to use Glyco's 99+% active sequestering agent, the purest EDTA available commercially. No foreign materials are present. You pay no premium for added activity.

Effective against a wide range of di- and trivalent metal contaminants, this EDTA is stable to storage and to all temperatures and pHs commonly encountered. It chelates efficiently in high concentrations and extreme dilutions of metal ions.

These are some of the industries which use one or more of the TETRINE sequestering agents—Glyco's EDTA and its salts:

Textile	Germicide
Soap	Latex
Detergent	Leather
Rubber	Metals
Cosmetic	Pulp & Paper

Our modern plant is especially designed for the manufacture of the TETRINES. This plant, these products, our experienced personnel—all are geared to the elimination of your contaminant troubles. Send for samples and catalog.

GLYCO

PRODUCTS CO., INC.

Dept. A

Empire State Building

New York 1, N. Y.

NONIONIC SURFACTANTS • SYNTHETIC WAXES • SEQUESTERING AGENTS

NOW ADD SALES

You'll notice in this issue that the name of the Distribution department (p. 72) has been changed to Sales and Distribution. This reflects neither a change of policy nor of content of the department. Rather, we feel that the new title is more descriptive of the department's main emphasis: sales and sales techniques, rather than on the mechanics of a distribution system.

Howard C. E. Johnson

hard-working committeemen and to Eli Lilly's sense of propriety.

The inspection trip the congressmen made amounted to a seminar on production and testing of poliomyelitis vaccine. It is to the credit of Chairman Priest and members of his committee that they were willing to spend a weekend of their own time and considerable extra effort to learn firsthand about a subject for which they have legislative responsibility. . . .

JOHN F. MODRALL
Eli Lilly and Co.
Indianapolis, Ind.

SEE YOU THERE

National Industrial Health Conference, meeting, Convention Hall, Philadelphia, April 21-27.

American Management Assn., conference on systems planning and control, Hotel Roosevelt, New York, April 23-24.

American Zinc Institute, 38th annual meeting, Hotel Statler, St. Louis, April 23-24.

Assn. of Consulting Chemists & Chemical Engineers Inc., symposium and banquet, 5:00 p.m., Hotel Belmont Plaza, New York, April 25.

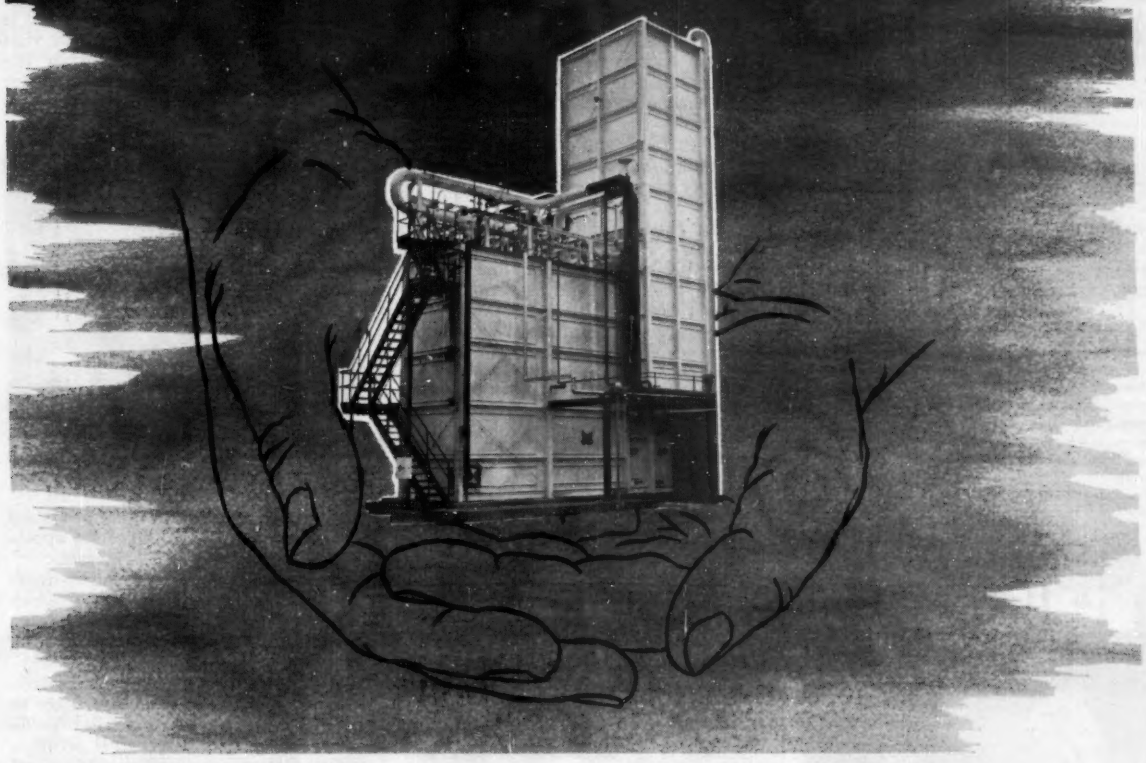
Society of Plastics Industry, Midwest plastics conference, French Lick-Sheraton Hotel, French Lick, Ind., April 26-27.

National Sanitary Supply Assn., 33rd annual trade show, Conrad Hilton Hotel, Chicago, April 29-May 2.

American Management Assn., conference on managing foreign operations, Hotel Roosevelt, New York, April 30-May 2.

Chamber of Commerce of the U.S., 44th annual meeting, Washington, D.C., April 30-May 2.

An Air Products "ON-LOCATION" GENERATOR keeps your OXYGEN-NITROGEN supply always in your hands



If your processes require oxygen or nitrogen in volume, your own "on-location" generator can be a tremendously profitable investment. With the free air for raw material, it can substantially reduce the cost of your end product and eliminate all uncertainty regarding your oxygen or nitrogen supply.

We are prepared to design and build for your requirements:
Large Capacity Tonnage Generators, regardless of size, purity, or cycle, with liquid pumps

or

"Packaged" High Purity Generators, producing high purity oxygen and nitrogen simultaneously —delivered safely under pressure by Air Products patented liquid pumps.

Make this oxygen-nitrogen source a member of your production family and save money. Consult us for comparison of costs.

More than 700 successful installations

Air Products
INCORPORATED
Dept. J, Box 538, Allentown, Pa.

Cost Analyses
Process Design
Apparatus Design
Apparatus Manufacture

Corrosioneering News

Quick facts about the services and equipment Pfaudler offers to help you reduce corrosion and processing cost.

Published by The Pfaudler Co., Rochester, N.Y.

Hundreds of stainless steel dimples cut kettle costs as much as 20%

If you need a jacketed stainless steel reaction kettle—for nonpressure use, or for high pressures—you can cut up to 20% off its initial cost with the Pfaudler dimpled jacket design.

This exclusive design permits the use of a lighter gauge metal in the jacket, yet strengthens the metal to the point where it is as strong as, or even stronger than a nondimpled, heavier jacket would be.

Specially built dimpled jacketed reactors, like this one, have been fabricated as large as 7,000 gallons.

The dimples are hundreds of indentations with reinforced welds, and they are obtainable in low-cost *standard* reactors from 750 to 2000 gallons. Jackets may be either carbon or stainless steel.

You get greatest savings on reactors requiring a jacket pressure of 150 psi, but even when you only plan to use 50 psi, the Pfaudler dimpled jacket uses less material and costs less than conventional jacketing.

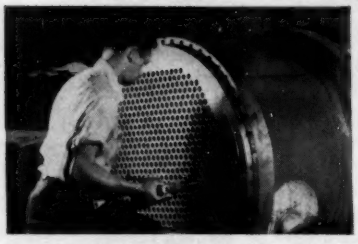
Besides the standard designs up to 2,000 gallons, you can also enjoy the benefits of this dimpled construction in special custom reactors built to meet your special needs.

The National Board of Boiler and Pressure Vessel Inspectors have approved this construction for 150 psi jacket pressure, and we can supply vessels bearing the code stamp.

Heating and cooling is as fast as with conventional jackets, and in many cases has proven faster.

If heat treating is desired, Pfaudler has complete facilities to heat treat stainless steel jackets of this dimpled type, giving you exceptionally long-lasting equipment.

LOW-PRICED HEAT EXCHANGER HAS 8 VALUABLE VIRTUES



An electronically controlled roller expander locks the tubes in position in the tube sheet during careful fabrication at Pfaudler.

Pfaudler fixed tube sheet heat exchanger is simple in design, hence costs you less than other types.

Fabricated from stainless steel or alloys, it gives you a number of advantages. Here are eight:

1. Versatility—Most widely used type of heat exchanger in the chemical industry. Used as a heater, cooler or condenser.

2. Easy cleaning — Tubes are straight and you clean them easily by simply removing the heads. Shell side may be flushed with chemical solutions.

3. Low cost—Because of large quantity production, standardized design, and use of full tube bundles, prices of fixed tube type heat exchangers are the lowest per square foot of any heat exchanger.

4. Fast delivery — A large number of Pfaudler fixed tube sheet stainless heat exchangers are maintained in stock, and you can often get delivery within one week when required.

5. Replacement of parts — Pfaudler carries a complete line of standard heat exchanger parts in stock and shipment may be made on short notice.

6. No intermix — The tube sheets are welded to the shell. Therefore, there is no possibility of tube side fluid mixing with shell side fluid since there are no internal gaskets.

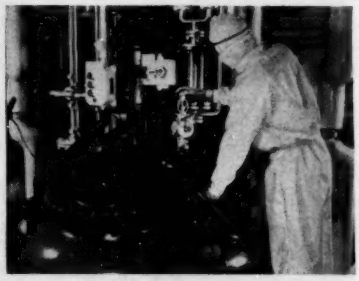
7. Expansion diaphragm — When necessary, an expansion diaphragm may be installed to take care of differential expansion between the shell and tube side.

8. No leakage — By means of an electronically controlled torque tube expander, leakproof joints are obtained between tubes and tube sheets. Further insurance against leakage may be obtained by using double tube sheets, or seal welding the tubes to tube sheets when so desired.

How to protect color and purity of plasticizers during polymerization

Color and purity are the prima donnas of the polymerization process.

Contamination can spoil both. To avoid it, you need equipment that is easy to clean between each run, that resists the corrosive action of the chemicals involved, and that does not put metal in contact with your product.



This type of glassed steel kettle, used in the manufacture of polyester resin, helps protect product from contamination.

That's why Pfaudler glassed steel reactors have found universal application as polymerization vessels.

Practically nothing sticks to their glassed interior. They wash clean quickly and easily between runs, avoiding contamination of succeeding batches.

Resisting all acids (except hydrofluoric) and alkaline solutions up to pH 12 and 212° F., Pfaudler acid-alkali-resisting glassed steel protects your product from contamination and protects your equipment investment from excessive replacement needs.

Full year's guarantee against corrosion

In fact—the corrosion resistance of Pfaudler glassed steel is so well documented that we offer a full year's guarantee against corrosion destruction, under the conditions for which the vessel is sold. 12 months of 100% freedom from corrosion, even if you process 24 hours a day!

Nonmetallic

Contamination by metals—particularly iron—can cause discoloration of your product. You get the tremendous strength of steel, but not the ferric contamination, when you use glassed steel. The glass is permanently bonded. It doesn't peel or flake off.

Write or call for additional details.

TITANIUM HITS ITS STRIDE

New advances make this amazing metal even more useful to chemical processors

A considerable amount of information on the corrosion-resistant properties of titanium has been published and the role that titanium will take as a material of construction for the chemical industry is becoming more plainly defined.

Titanium's corrosion resistance can be likened to an improved stainless steel. Both metals can exhibit an active and passive state. However, titanium is resistant to a broader range of corrosive media—from very strong oxidizing conditions to mild reducing conditions.

While stainless steel has good resistance to boiling concentrated nitric acid, titanium is also resistant to the fuming nitric acids and to some nitric acid solutions above the boiling point. On the reducing side, titanium is resistant to dilute solutions of sulfuric and hydrochloric acid up to 100° F. Inhibitors such as nitric acid and copper sulfate greatly extend titanium's resistance to sulfuric acid solutions. The inhibiting effect of nitric acid in aqua regia accounts for titanium's resistance to this highly corrosive solution. Titanium is not resistant to hydrofluoric acid or most phosphoric acid solutions.

Special resistance

To date, it is believed that titanium is free from intergranular corrosion. Tests performed on welded and heat treated samples indicate that it is free from this type of corrosion.

Tests indicate that titanium is also free from stress corrosion cracking in many solutions, such as those containing chlorides, that cause this type of corrosion in stainless steel. The only medium found to date to cause cracking in stressed titanium is red fuming nitric acid. Stress relieving at temperatures as low as 1000°F. will prevent stress corrosion.

Titanium's resistance to pitting corrosion is one of the most important features of its corrosion-resistant properties. Ferrous chloride, cupric chloride and hypochlorite solutions, normally extremely active pitting media, do not affect titanium. Tests to date also indicate that titanium is highly resistant to contact or crevice corrosion. These features will prove valuable for equipment where frequent cleaning is impossible, where it is difficult to eliminate crevices or where stagnant conditions may develop.

Strangely enough, this "new" material, now making its debut in processing equipment, is actually the ninth most abundant element in the earth's crust. However, it was of little value to mankind until a method was found to produce it without impurities. This was accomplished only 24 years ago.

Stable, light, strong

Today, we're finding the corrosion resistance of titanium, along with its strength and light weight, of immense importance in chemical equipment. It weighs half as much as stainless steel, and only 50% more than aluminum. Its melting point is 3125° F.—higher than stainless.

But it has some drawbacks, too. Cost of titanium is high, because of the difficulty in producing it from the ore. It can be welded only to itself, and this must be done in an atmosphere *absolutely free* of oxygen, nitrogen or moisture.

New products

At Pfaudler, we've come to know titanium very well, by working with it over an extensive period of time.

Past and current fabrication has included titanium heating coils, heat exchangers and pilot-size reactors. Other products are "in the mill" and will be announced as they become available.

Solving the welding problem was our biggest headache, and we found it necessary to design and construct our own inert atmosphere chamber to do the job. With this accomplished, it becomes apparent that we will now be able to pursue the possibilities of this unique metal to its limit—and produce more useful new items for the processing industries.

10-gallon titanium reactor, designed for pilot plants, was introduced to the chemical industry last year.

Free booklet shows how to scale up to pilot production

Reproducing in the factory the same conditions under which your process was developed in the laboratory can often be a puzzling problem.

Not only must you find commercially pure chemicals, but you must also find equipment which has basically the same corrosion resistance, heat exchange properties, and other characteristics as your laboratory equipment.

A new booklet, Bulletin 927, has been published by Pfaudler to give you full details on a series of glassed steel reaction kettles that permit perfect scale-up from 5 to 100 gallons (at which point a larger Pfaudler series takes over and permits scale-up to full production).

Using acid-alkali-resisting glass, these vessels not only provide accurate scale-up within their own series, the Pfaudler "P" Series, but they also give the same properties as the glass beakers and other vessels used in the laboratory.

They handle a broad variety of products, and have versatile multi-purpose agitation. They are obtainable for rated pressures up to 150 psi, and temperatures up to 600° F.

For complete specifications, sizes, photos, and descriptions, mail the coupon for your copy of Bulletin 927, "Pfaudler Type P Glassed Steel Reactors."

30-gallon glassed steel reactor has variable drive from 60 to 340 RPM.

For further details clip and mail this coupon.

The Pfaudler Co., Dept. CW-4, Rochester 3, N. Y.

Please send me:

- ☐ Glassed steel polymerizers (Bulletin 926)
- ☐ Dimpled stainless steel jackets (Bulletin 904)
- ☐ Heat exchangers (Bulletin 837)
- ☐ Titanium (Data Sheet 34)
- ☐ Lab and pilot plant reactors (Bulletin 927)

Name_____

Title_____

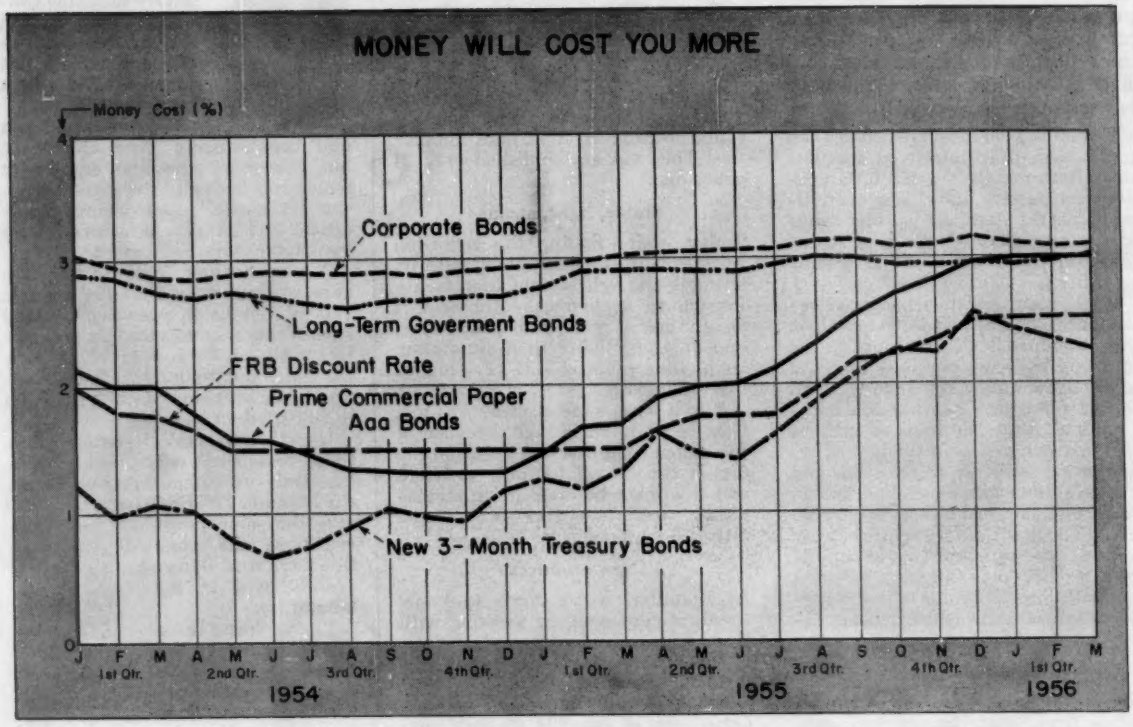
Company_____

Address_____

City_____ Zone____ State_____

Pfaudler
Corrosioneering News

Published by The Pfaudler Co., Rochester, N. Y.



Interest Rates Are Heading Up

The chemical industry's plans to boost spending for new plants and equipment has—along with the current general optimism of business—brought a new complication for company executives: it's hard to get money for expansion these days at rates available six weeks ago—and it will get more difficult as time goes on.

Last Thursday afternoon, the Federal Reserve Board boosted by ¼-½ % the rate its regional offices charge other banks. And within two hours, top New York banks had started raising the rate they charge the best credit risks, from 3½ to 3¾ %.

Bank executives and top Chemical businessmen just queried by CHEMICAL WEEK feel these boosts may not be the last. And so, from Detroit to Jacksonville to Los Angeles, from Atlanta to Cleveland, chemical companies are worrying about how to get money at a price they want to pay. But money rates (*see chart*) are going up.

Top Targets: It's the newer and smaller companies that are feeling the pinch more. "Old established customers," reports a *CW* correspondent in Atlanta, "don't have trouble getting new loans. But there is a tendency on the part of banks to be highly selective about new applicants."

BANKS LIFT RATE ON BROKER LOANS

From a Midwest banker: "Companies have got to show a lot better balance sheet today than they did a year ago to get the same loan. We're a whole lot more selective than we were a year ago."

And even the blue chips are paying more. Take one company that sells over $100 million worth of goods a year. Under an agreement negotiated last year, it could borrow $4 million at a 3⅛ % rate any time through this spring. It doesn't need the money now, but can't get the agreement extended. It may have to pay 3⅞ % or more for such a loan by summer.

Generally, however, larger companies won't have too much trouble. As one New York banker put it: "Of course we're in business to loan money and to get new customers—but we've got to take care of the old customers first. The others must

wait their turn." A Cleveland banker adds: "They have to try harder now, but they wind up getting the money anyhow—if they are a good risk."

Prime Interest: Fewer companies, too, will be getting loans at the lowest or "prime" rates.

"Banks have been guilty of doing lazy banking—giving the prime rate to everyone who came near qualifying," a prominent New York banker reports. "In today's high-priced money market we just can't go on doing this anymore." But nothing would be accomplished, he continues, by jacking the prime rate any higher. More intensive selectivity of borrowers given the prime rate, he contends, is the "more realistic, sounder" way.

New York's Chase Manhattan, the country's second biggest bank, says it's in the process of "upgrading" 70% of its borrowers who had been drawing a prime rate. These customers, he says will now be charged from one-fourth to one-half a percentage point more on their loans.

As one Guaranty Trust official told *CW*, this trend to "get more and more names off the prime list" has been accentuated in recent weeks, when banks have found themselves increasingly strapped for reserves to meet bigger demands for funds.

One reason behind the tighter credit policy is dwindling corporate deposits in their banks. Company treasurers are getting a better return on their ready cash elsewhere. Many are investing in short-term government bonds. Thus banks are unable to draw on deposited reserves when lending money.

Area Picture: New York, of course, is the major source of money for chemical companies.

Since the first of the year, business loans made by New York banks have jumped $797 million, compared with $177 million increase in the same period last year. Total loans on their books this month are about $10 billion, an increase of some $2.3 billion over a year ago.

In the Southeast, Richmond economists report that chemical and allied industries in the fifth district have boosted the volume of their outstanding short-term bank loans by at least 40% since last October.

Other business categories have shown smaller increases or even net declines. Most significant gains in chemical company borrowing showed up during the first quarter of '56.

A Cleveland banker points out that business loans in the fourth federal district went up to the tune of $89 million during the month of March. For the same period in '55 they were up only $49 million.

Similar increases were reported from such other centers as Pittsburgh, Detroit, Jacksonville and Houston. In fact, there was only one exception—Los Angeles. There, the Security First National Bank reports: "Money in the Los Angeles area is easier than in the East. Ratio of loans to deposits is less than in many central reserve areas." Significantly, however, it is taking a closer look at management practices of the borrower: "You've got to be better to stay in business these days."

Such a "selective" policy applies in full measure to marginal risks and to the smaller companies. The president of a small Southwestern chemical firm expressed it in this way: "Despite the fact that our firm has become well established in the community and our business with the banks has increased, we are still finding money tighter."

Another Texan, president of a chemical specialties firm, displayed no uncertainty when he said: "You can be right sure that banks are choosier about people they give low rates to."

Where It's Going: Some money is being used to meet taxes and other normal expenses. But the feeling is that the biggest slice will go to finance new expansion programs and, in some cases, inventory buildups. Specific uses for the new money, however, vary within the industry.

One Pittsburgh specialties maker believes "there isn't much borrowing for inventory or taxes; it's for plant expansion and advertising campaigns."

A prominent Pittsburgh banking official thinks local chemical companies are not borrowing much for inventory because seasonal business has not yet paid off. So now, he believes, they are borrowing for accounts receivable, to hold them over until money starts coming in.

Atlanta banking executives concede that this may be true in some cases, but they emphasize that practically all money borrowed by chemical companies in that area is equally divided between uses as working capital and for financing expansions.

Onward, Upward: An official of the Tradesmen's Bank & Trust Co. of Philadelphia injects an encouraging note: "Of all the industries, the chemical in the last 10 years has shown outstandingly rapid and vital growth due to research, product development and marketing techniques. Chemical companies are excellent lending risks."

The question of how long the boom will last, of course, is of paramount importance to lender and borrower. Both seem to believe that better "road signs" are needed to give a reasonably accurate forecast of the course of the economy.

What would one such road sign be? A Jacksonville banker beamed and unhesitatingly drawled: "Ike's re-election."

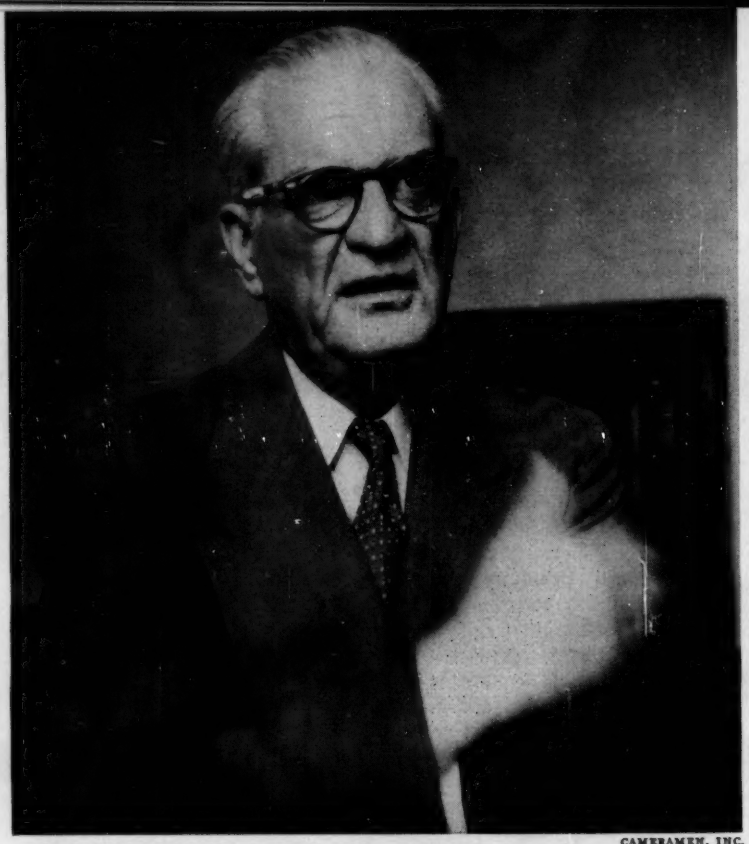
Money Market

Borrowing Costs Turn Upward Again; Demand For Loans Increases

New York Bankers Downgrade Customers; Tighter Money May Hit Home Builders

2 Big Banks Lift Charges on Securities Credits From 3.75 to 4%

Deposit Drain Sharply Cuts Money Supply



CAMERAMEN, INC.

IRS'S HARRINGTON: He'll make the decision on . . .

Exempting the Trusts

Several corporate giants, including Du Pont, were sounding off in Washington last week against a proposed tax ruling okayed by Internal Revenue Service chief Russell Harrington and aimed at huge pension trust funds they've set up for their employees.

They appeared at a public hearing before IRS officials on a proposed regulation, first published in January, applying a new test for pension trusts seeking exemption from corporate income taxes.

The test, itself, is not of IRS's making. Rather, it was imposed by Congress when it overhauled the Internal Revenue Code in 1954. Under the new code, pension trusts lose their tax-exempt status if they accept inadequate securities as collateral from those who borrow money from them.

The protesting corporations and IRS were deeply involved in argument throughout the hearing over the way IRS's proposed regulation defines "adequate security"—the term used in the revised statute. The government's tax lawyers would exclude from their definition, and thus prohibit, loans with a borrower's common stock or unsecured debenture bonds as collateral.

As the rule now reads, a pension trust jeopardizes its tax-exempt status unless the loans it makes are backed by adequate security. And as IRS sees it, adequate security, to Congress, means collateral—a mortage, pledging the borrower's property or an accommodation endorsement.

Strain and Stress: The protesting firms argued at the hearing that IRS, through a "strained interpretation" of what constitutes a loan, went beyond Congress' intent to protect employee beneficiaries and came up with some "absurd results."

Commented Du Pont's R. A. Wentz: "We cannot find any warrant in the legislative history for interpreting adequate security to mean collateral. We think Congress would regard the promissory note of a strong corporation as adequate security on any loan it makes from a pension trust."

As Wentz and other witnesses saw it, IRS's definition flatly prohibits a pension trust from buying its employer's unsecured debenture bonds because such investments, even when made through an open market purchase, are construed by the rule as a loan to the employer. Yet, these debentures are still permissible investments for other firms' pension trusts.

The Bell System's G. N. Armstrong pointed up the obvious discrimination in this treatment. A. T. & T.'s pension trust, under the proposed rule, could not buy debentures issued by Bell System companies, but pension trusts of other companies could buy Bell debentures. And, since Bell System debt accounts for fully 12% of all postwar corporate debt, this limitation places the A. T. & T. pension trust and its employee beneficiaries at an "unfair disadvantage relative to other trusts and fiduciaries," he contended.

Uncommon Common: IRS's rule also prohibits a pension trust from accepting the employer corporation's common stock as security for a loan to the employer. But, there's nothing in the rule disallowing a pension trust from buying this stock as an investment. And, like debentures, common stock has no more nor less security behind it than the issuing firm's financial strength and integrity. "These anomalies," Wentz charged at the hearing, "just don't make sense."

R. G. Magill of General Motors summed up the attitude of businessmen when he told IRS: "The unanimous conclusion of the business community is that these interpretations [by IRS] are wrong. They don't accord with common understanding of what constitutes a loan or an adequate security. Under your interpretation you would almost have to say that U.S. government savings bonds have no adequate security behind them. And that borders on the ridiculous."

Southern Pacific's John E. Shea pleaded with IRS to draw a line between transactions by pension trusts established by large, financially sound firms and those set up by smaller and weaker employers. The latter, he argued, constitute the group whose employees Congress felt needed stronger protection.

After hearing business complaints and suggestions last week, Harrington's men must now decide whether to make any changes before issuing a final interpretative ruling.

Coming: New Lineup in Acrylics

American Cyanamid will double acrylonitrile capacity at its Fortier plant, near New Orleans, in a strong bid for acrylonitrile dominance.

While the firm's present units at Fortier and at Warners, N.J., give it some 40% of total U.S. capacity (Monsanto runs second with 30%), the expansion could boost Cyanamid's potential production to 55% by the time it goes onstream in 1958.

The new plant represents substantial investment. While Cyanamid isn't talking about plant costs, a company representative is known to have told the Louisiana Board of Commerce (*CW Business Newsletter, March 17*) that it would spend $39 million—bringing total plant investment at Fortier to $80 million.

Parts to the Whole: When construction of the plant began in 1952, engineers allowed for the possibility of doubling size.

But the company will still have to completely duplicate several units—the ones that produce oxygen, acetylene and hydrogen cyanide; it will expand present capacity for sulfuric acid and refrigeration; existing units that produce acrylonitrile derivatives will be modified.

Fiber Future? Of course, the big market for acrylonitrile now seems to be fibers (*CW, Oct. 1, '55, p. 69*), but other outlets are springing up. The company is considering large-scale production of the acrylonitrile derivative, acrylamide—but as yet it hasn't made the go-ahead decision.

There's hope, too, for expanding sales of copolymers of acrylonitrile with styrene (as Bakelite C-11, saran F-120, Kralastic, or Marbon) or with styrene derivatives. Cyanamid has just completed a monomethyl styrene plant at Fortier (*see p. 98*), and has done substantial development work on combination of this material with acrylonitrile.

Right now, however, chemical insiders with an interest in acrylics are looking to Allied Chemical, which reportedly is pilot-planting a synthetic fiber copolymer of acrylonitrile and styrene.

Dow's Doings: Meanwhile, back in Texas, Dow revealed additional details about its planned expansions at Freeport. With a new unit planned for manufacture of acetylene, it has been considered a likely candidate for acrylonitrile production, especially if it introduces its synthetic fiber this year (*CW Business Newsletter, Feb. 11*).

At a press conference in Freeport, Board Chairman Earl Bennett, in commenting on the company's entry into acetylene chemistry, said that Dow does not have immediate plans for fiber manufacture—but could produce fibers some time in the future.

But, stressed Bennett, Dow's production of acetylene would be available for companies that wished to get into the fiber business, as well as for other uses.

EXPANSION . . . .

Sulfuric Anhydride: General Chemical Division (Allied Chemical & Dye) plans to build a plant to manufacture stabilized sulfuric anhydride at its Calumet (Chicago, Ill.) works.

•

Stauffer Chemical plans to spend about $450,000 at its Niagara Falls, N. Y., plant to expand existing units producing chlorine, caustic soda, titanium, silicon and zirconium tetrachlorides.

•

Titanium Dioxide: Metal & Thermit Corp. expects to begin rutile-mining operations later this year on a tract of some 800 acres in Hanover County, Virginia.

WIDE WORLD

Chemical Tally in the House

TOTTING UP what may well be a chemical score are Representatives Harold Cooley (D., N.C.), *left*, and Sam Rayburn (D., Tex.), shown checking the House of Representatives vote tally on the compromise farm bill passed last Wednesday, 237-to-181. Cooley and Rayburn are principal authors of the bill. The vote and Monday's Presidential veto are now getting avid attention from fertilizer makers, whose business might feel the impact of several of the bill's provisions (e.g., soil bank, marketing quotas, among others).

Washington Angles »

» **Water pollution control bill sponsors** plan a House vote by May 1. But they must first hurdle strong Republican objections to $1 billion in grants to build city sewage treatment plants. Rep. John A. Blatnik (D., Minn.) says he's been getting heavy mail from city groups asking that the grants feature be retained.

So, he's more determined than ever to resist when GOP committee members move to strike out this provision.

» **A permanent Congressional committee** to study manpower shortages in scientific and technological fields is the goal of a bill introduced last week by Sen. Edward J. Thye (R., Minn.). He wants a bipartisan, 16-member House-Senate group to keep Congress "fully informed" on the problem.

While there's little chance of approval this year, the bill indicates Congress' growing concern that Russia may soon pass the U. S. in its number of available scientists.

» **Is the White House brushing off** criticism of government security risk procedures? Yes, say some members of the National Academy of Sciences committee that studied use of loyalty tests in connection with government-supported unclassified research.

For one thing, Eisenhower released the report without the usual word of support.

For another, White House staffers deleted from the final version several pointed examples showing how overzealous security aides hamper research progress.

Phenol: Donner-Hanna Coke Corp. (Buffalo, N. Y.) will spend more than $187,000 to improve its coke-oven gas purifying facilities. One $47,400 unit will be used for phenol recovery.

•

Aromatics: Continental Oil Co. will spend $3 million to add 11,000 bbls./day of catalytic reforming capacity at Ponca City, Okla.

•

Cement: Verde Valley Industries will boost its proposed cement plant capacity at Clarkdale, Ariz., from 2,500 to 5,000 bbls./day.

• Republic Cement Corp. will add a $6.5-million cement unit at Drake, Ariz., with initial capacity to produce 800 bbls./day of white cement and 2,500 bbls./day of gray cement.

•

Celanese Corp. of America has budgeted $100 million for expansion over the next five years, mostly to develop the company's chemical and nontextile operations.

COMPANIES. . . .

United Cork has acquired Badische Anilin (Germany) licenses to manufacture expandable polystyrene and molded finished products at its Uni-Crest Division (Kearny, N.J.).

•

Cowles Chemical Co. stockholders approved splitting the company's stock on a 2-for-1 basis.

•

Food Machinery and Chemical stockholders will vote at their annual meeting, May 22, whether or not to increase authorized outstanding common shares from 5 to 10 million.

•

Liquid Carbonic shareholders approved a proposal to change the company's common stock from no par to $15 par value.

•

Kaiser Aluminum & Chemical Corp. stockholders will vote this week on a proposal to create 750,000 shares of $100 par convertible preferred stock.

FOREIGN. . . . . .

Dyes/Argentina: A newly established plant in Llavallol, near Buenos Aires, is expected to cap the flow of certain Argentine dye imports. The new unit will turn out 500,000 kilos/year of azo dyes—more than enough to satisfy present domestic demands. It is owned jointly by Farbenfabriken Bayer (Germany) and Compania Quimica (Argentina).

•

Polyester Fiber/Germany: Production of polyester fiber has just begun at two West German chemical plants. Licensed by Imperial Chemical Industries (ICI), Vereinigte Glanzstoff Fabriken is introducing the fiber under the tradename Diolen, and Farbwerke Hoechst will sell it as Trevira.

•

Polyethylene/Holland: The Netherlands State Coal Mines are now blueprinting a $10-million polyethylene plant to be constructed at Geleen in South Limburg. The initial output—500 tons/year of Ziegler-process polyethylene—is expected to satisfy the needs of the Benelux countries. Surpluses will be exported to world markets.

•

Oxygen/England: British Oxygen Ltd. has just completed a new plant near Dundee, Scotland. It will compress 500,000 cu. ft/week of oxygen into cylinders for distribution along with other industrial gases. New facilities include a unit for producing dissolved acetylene at a rate of 350,000 cu. ft./week.

•

Sulfa/South America: Ceremonies inaugurating a new sulfa drug plant took place last week near Buenos Aires. The plant was built by an Argentine subsidiary of American Cyanamid, Lederle Laboratories S. A. In addition to sulfas, the $1-million factory will also produce Aureomycin.

•

Potash/Jordan: The Arab Jordanian Potash Co. will construct several plants to extract salts and other chemicals from the waters of the Dead Sea. The newly formed company will have $13.5 million in total capital. All six Arab League states will contribute some money, with the rest to be provided by private Arabian investors. An agreement with the Jordanian government gives the company exclusive rights to exploit the Dead Sea materials.

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At Eli Lilly's new Tippecanoe Laboratories . . .

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RAPT ATTENTION: High school students in Tennessee get information and vocational guidance from industry as . . .

Blue Jeans Aim for the Lab

As Chemical Progress Week activities dot management calendars next week, chemical executives will invade classrooms everywhere to lend emphasis to the campaign for more science and engineering students. But around Columbia, Tenn., the appeal will have an added attraction—a CPW show with a counseling service for students.

Five Chemical companies—Du Pont, Victor, Monsanto, Union Carbide and Carbon's National Carbon Co. Division, and International Minerals & Chemical—plus three local educational, service and professional groups are pooling their resources to provide what the CPW Committee in Maury County calls "the first step in the comprehensive vocational guidance program we're planning."

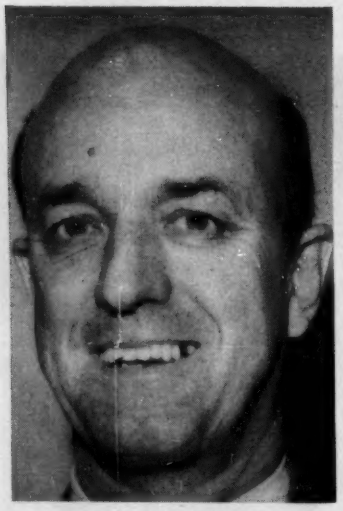
Personal Counseling: At the show, to be held in a local auditorium, participants will provide a special "vocational guidance" booth open to all students visiting the show. According to the committee, men from several technical professions will counsel each student who desires it. They'll provide booklets on the cost of a college education, on the opportunities in science and engineering, and they'll impart their own professional knowledge.

In addition, the committee has garnered information on the schools in the Middle South area and the scholarships and financial aid available to engineering and science students. There'll also be a battery of aptitude, intelligence and interest tests, which will be scored by the Tennessee State Testing and Guidance Center at the University of Tennessee. To follow up, a representative of the center will later come to Columbia and counsel with each tested student and his parents.

Crowds Expected: Some 1,500 student visitors will likely attend this year's CPW exhibit in Columbia, nearly half the county's total high school enrollment. Under schedules worked out with school principals, the students will see the show in groups. Last year's visitors included 800 students from nine of the county's high schools, plus about 600 other guests.

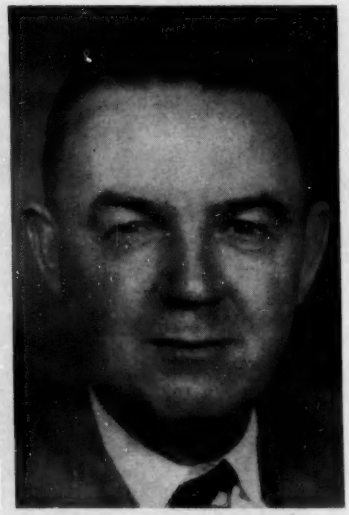
Besides the vocational guidance feature, each of the companies is contributing a booth representing some phase of science or engineering in the industry. Du Pont will highlight chemical engineering; Victor, the applications of electrical engineering; Monsanto, mining and chemistry; National Carbon, mechanical engineering; International Minerals, geology. A local pharmacy association, the county hospital and the University of Tennessee will have exhibits relating to pharmacy, medical technology and chemical engineering.

Throughout the country, Chemical Progress Week will be aimed at kindling students' interest in scientific and engineering careers. But at Columbia, industry executives are planning to follow through with needed help in the welter of problems confronting budding science students.



PROPONENT

OPPONENT



REFEREE*

At Issue: Must Engineers Be Licensed?

Engineering as a profession and engineering as big business—they may be compatible after all.

This bodes well for chemical process companies, particularly those that have big expansion plans in mind for the coming years; and the anticipated accord between engineering societies and engineering companies—though details may have to be threshed out anew in every state of the union—is also a source of cheer for individual engineers.

For years, chemical and other engineers have been split into fratricidal factions over such topics as registration, licensing, and corporate practice. Now—following Missouri's recent adoption of an engineering law that embodies new and more generally acceptable wording of an old and unobjectionable principle—an honorable compromise is in sight.

Compulsion in California: What the professional engineering societies were afraid of was that the work of their professions might be largely taken over by big engineering companies in which individual engineers would serve as little more than draftsmen, surveyors and leg-men. Though exact phraseology has yet to be decided, it now appears that the National Society of Professional Engineers and the Committee on Engineering Laws (representing engineering companies) will shake hands on these provisos:

- Professional responsibility for engineering work to be recognized by state laws as a personal responsibility.
- No discrimination in state laws as to the form of business organization —individual, partnership, or corporation—used by engineers.
- Persons in charge of engineering activities must be legally registered—or licensed—professional engineers.

Right now, however, disagreement over that licensing point is enlivening discussions in engineering groups in California. Leading the opposition to bills that would require registration of engineers in that state are the northern California and southern California sections of the American Institute of Chemical Engineers, whose members work for most of the chemical process concerns there and whose spokesman is research and development engineer Tom Drisko of Dow's Pittsburg, Calif., plant.

Two Bills Pending: Coming up for public hearings this summer before a legislative committee headed by State Senator Luther Gibson are a proposal by State Senator Fred Kraft calling for compulsory registration of mechanical and electrical engineers and a more sweeping measure introduced by Assemblymen Charles Chapel and A. I. Stewart to cover all mechanical, electrical and chemical engineers.

About half of AIChE's California members don't like the idea of compulsory registration at all. The other half favors compulsory registration only if it applies to all professional engineers, regardless of specialization. Both groups are worried about being restricted in their own practice if registration of some engineering categories means that—by way of example—only a registered mechanical engineer would be allowed to design a heat exchanger.

With its membership split over such issues, AIChE's executive council has adopted—as "tentative policy"—the stand that only those engineers in responsible charge of engineering work need to be registered. Thus AIChE and NSPE are in accord at the top, but their California branches still don't see eye to eye on those two bills.

But—as evidenced by the tentative agreement between NSPE and CEL—engineers seem to be able to work their way out of such impasses more readily than lawyers. And both NSPE and CEL are expected to look into the California tiff next month, suggesting that another "Missouri compromise" may be in the offing.

*Assemblyman Chapel, Engineer Drisko, State Senator Gibson.

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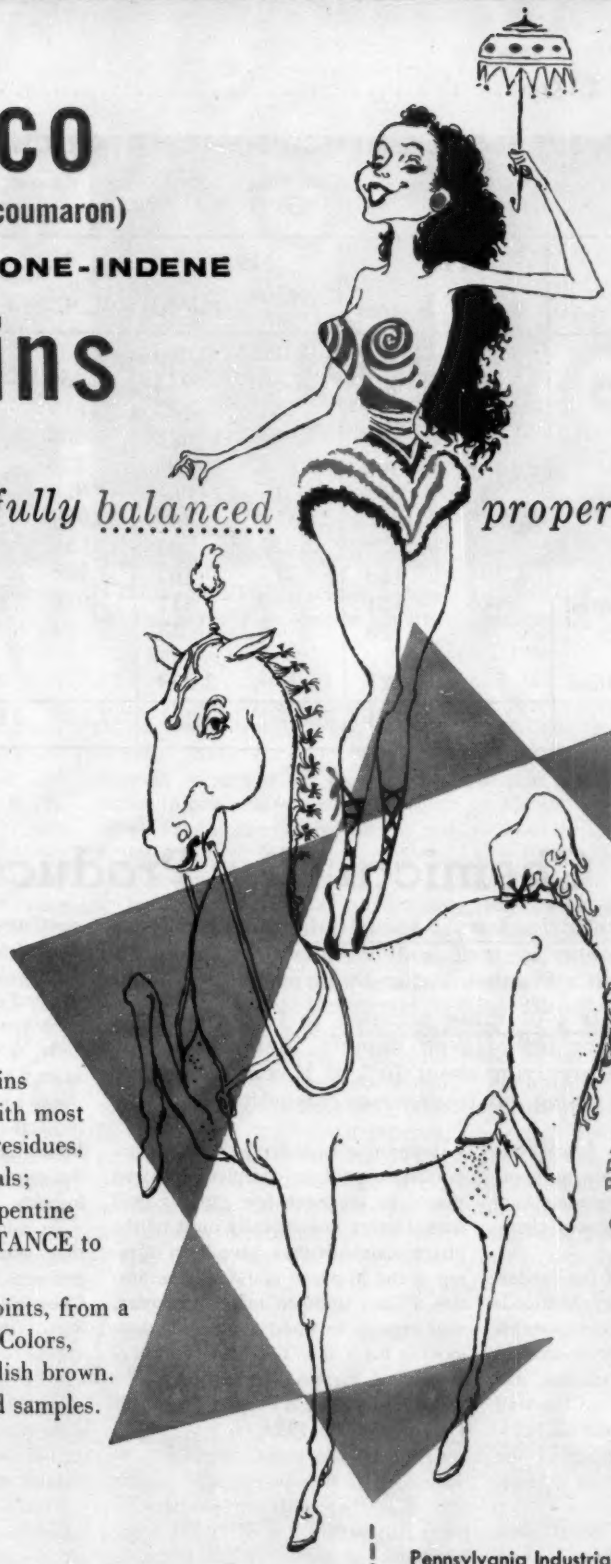

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NARROWING, BUT SLOWLY: MEXICO'S MARKET FOR CHEMICAL IMPORTS

(Value of chemical exports from U.S. and western Europe* into Mexico, in thousands of dollars)

	1952		1953		1954		1955 (Jan.-June)	
	U. S.	Europe	U. S.	Europe	U. S.	Europe	U. S.	Europe
Inorganic chemicals	8,221	1,275	8,400	2,006	9,154	1,531	6,116	907
Organic chemicals	14,770	495	15,791	944	14,656	1,166	6,668	1,043
Coal-tar chemicals	117	31	181	27	119	44	60	26
Coal-tar dyes, etc.	1,883	283	1,945	623	1,633	816	836	536
Dye tanning extracts	355	99	324	108	225	167	112	125
Paints, etc.	4,385	578	4,407	257	4,021	302	1,739	130
Drugs, etc.	19,903	1,290	20,131	1,362	18,901	2,026	8,695	1,003
Essential oils	2,150	—	2,523	24	2,748	—	1,360	127
Soap, cosmetics, etc.	4,207	132	1,717	167	1,179	183	566	77
Fertilizers, manufactured	2,013	151	2,399	411	3,916	1,869	5,653	769
Explosives	52	28	56	33	94	43	494	27
Chemical materials not elsewhere specified	16,153	1,421	14,176	2,259	15,512	2,889	11,262	1,694
TOTAL	74,209	5,783	72,050	8,221	72,158	11,036	43,561	6,464

*United Kingdom, West Germany, France, Italy, Netherlands and Belgium.
Source: United Nations' Commodity Trade Statistics.

Mexico's Chemical Cry: Produce Here

In its current drive toward industrialization, the Mexican government is applying tariff policies aimed at gradually achieving self-reliance in the chemical and pharmaceutical fields.

Intended effect of those policies: to foster domestic chemical production by pinching off imports. Meanwhile, U.S. chemical makers are supplying about 70% of Mexico's chemical imports, but may be losing out to overseas competitors.

PROTECTIVE tariffs, fierce competition, and a fast-growing population: these are the ingredients of Mexico's bid for an indigenous chemical industry.

Struggling to rise out of the "underdeveloped nations" category, Mexico is discouraging imports wherever possible in order to encourage establishment of domestic production facilities. Actually, the handwriting is on the wall —chemical companies intent on holding or increasing their shares of the Mexican market are planning to manufacture in Mexico.

Monsanto Mexicana, which has been making synthetic resins and molding compounds since 1951, last February began production of aspirin. Its sulfuric acid plant is nearing completion, and additional projects are quietly being planned.

Eli Lilly Compania de Mexico and Laboratorios Lederle, both major importers, expect to complete Mexican plants in the next few months, will manufacture domestically most of the pharmaceuticals they have been offering in the Mexican market. Laboratorios Pfizer, another major importer, also expects to build a plant, is now looking for a site. The Mexican pharmaceutical market, now an estimated $80 million/year, is expected to reach $100 million by 1959.

Celanese Mexicana recently announced a $5.6-million expansion and tells *CW* that additional expansion plans will be announced by midyear. And although Mexico does not have a petrochemical industry now, construction of four petrochemical plants is expected to begin this year, three by private industry.

The Mexican government's present policy—one that may be expected to continue — permits importation of needed pharmaceuticals and industrial chemicals. But import licenses are granted only in those instances where such products are not made domestically in sufficient quantities. As soon as any commodity is adequately produced in Mexico, the government protects the domestic producers by impeding imports through raising duties or by outright prohibiting such imports.

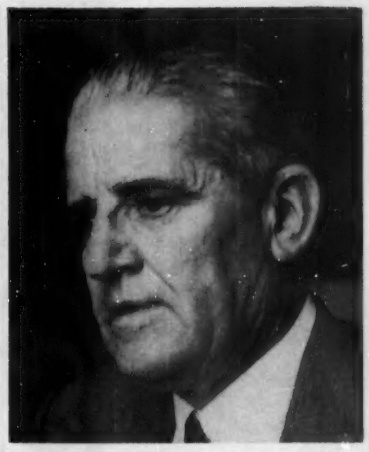
In addition, Mexico bans exports that would help rivals of domestic concerns. One victim so far: Root Chemicals, Inc. (San Juan, Puerto Rico), one of the major U. S. producers of steroid hormones, which used to import its raw materials from Mexico. Prohibition of further exports has forced this company to look for its raw materials elsewhere in Central America.

Even with these governmental policies, the buildup of a Mexican chemical industry promises to be a slow process because of the prevailing low standard of living. For instance, U. S. chemical firms often find that the Mexican market doesn't justify building expensive factories there.

However, the Mexican chemical

LEDERLE'S GARZA: For producers in Mexico, an inside track.

PFIZER'S MATHEU: From Europe and Japan, rising pressure on imports.



DU PONT'S BERTRAB: With good products, U. S. firms may hold edge.

market is still open for numerous items not yet produced there; and U. S. chemical manufacturers are now battling it out with European and Japanese competitors (*see table, p. 28*).

U. S. chemical executives in Mexico are well aware of this situation. James Matheu, manager of the chemical and agricultural division of Laboratorios Pfizer, states that while U. S. chemical firms now account for 70% of total Mexican chemical imports, European and Japanese chemical firms are threatening to cut that share to 40-50% in the next five years.

U. S. chemical firms have one constant advantage over their foreign competitors: close proximity to the Mexican market. But this doesn't seem to offset the Japanese and European firms' lower labor and transportation costs. Too, foreign companies are in many cases heavily supported by banks and governments, enabling them to extend longer credit terms to their Mexican customers. European and Japanese penetration of the Mexican market follows three roads: outright selling against competitive prices; investment in basic industries; and long-term technical assistance.

One example of an attempt to corner a share of Mexico's chemical market: plans of some Western European chemical firms to produce caustic soda in Mexico. Italy has brought its own long-range commercial artillery into the field by sending its Minister of Foreign Trade to talk about that country's willingness to assist Mexico in building up its chemical industry, promising technical assistance and partnership in forthcoming investments. Germany and Japan are following the same procedure.

One reason why this foreign competition might become increasingly irritating to U. S. chemical makers lies in the attitude of Mexican government officials who assert that U. S. prices in Mexico are too high. Those prices —about the same as in the U. S.—are kept high, according to the accusers, because U. S. companies fear that if prices were much lower for their products in Mexico, an unfavorable reaction would follow from U. S. consumers. The U. S. companies deny this, affirm that in Mexico, as at home, prices are determined by production and marketing costs.

In spite of all this, U. S. as well as other foreign chemical firms are buoyantly optimistic about the future. They see tremendous future growth of the Mexican market and they are confident that the Mexican government will permit them to share in that growth—though on its own terms.

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2 MAYORS*, PETROCHEMICAL PRIZE: On second thought, they're . . .

Agreed: No Chemical 'Grab'

Narrowly averted last week: a collision between municipal growth and industrial expansion, on the sandy plains outside of Orange and West Orange, on the Texas Gulf Coast.

A fight between those two municipalities is still in prospect, but it's not likely to have the adverse effect on petrochemical expansion that might have stemmed from the first threatened clash. As it is, the concerns already operating in the vicinity — Spencer Chemical, Goodrich-Gulf Chemical, Allied Chemical's Nitrogen Division, Acheson Dispersed Pigments and Du Pont — plus Firestone and other companies that may be planning to build there are free to plan future growth without worrying about additional taxes and regulations they'd be hit with if their sites were absorbed by either of the two towns.

For a few days, it looked as though annexation was in the cards for much of the area west and southwest of the Oranges; and it was nip-and-tuck as to which town would grab which piece of real estate.

Asked by Developers: The "Chemical Row" annexation hassle started when the West Orange council — at the request of landowners and developers—passed a resolution of intent to annex about 66 acres abutting an "industrial reserve" area.

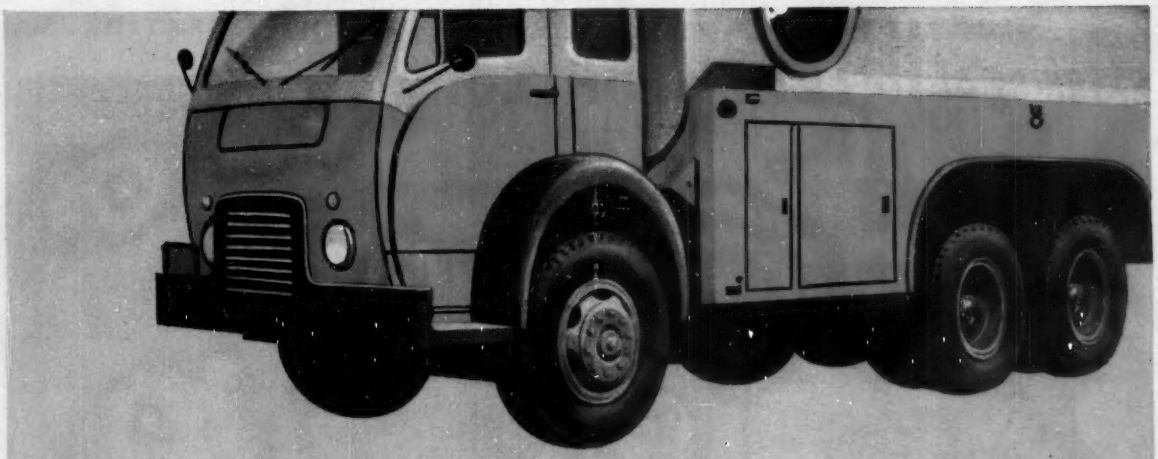
A few days later, the Orange city fathers — not wanting to be outdistanced by a town that ranks as little more than a suburb — began considering an ordinance calling for annexation of that same 66-acre plot and also for incorporating much larger areas to the west and south, extending right into Chemical Row.

West Orange retaliated by amending its original proposal to include a hefty chunk of land that Orange had just staked out; and the stage was set for litigation that might have kept local taxation and assessment matters unsettled for months.

Both Sides Back Down: But cooler heads prevailed, and both sides backed down from their most expansionist positions. At the insistence of property owners and industrialists, Orange erased from its annexation maps the tentative lines around two large parcels of land—including the one that had reached into Chemical Row. At the same time, the Orange City Commission adopted a policy against the annexation of any land occupied by or reserved for industry. (West Orange already had such a policy.)

A few days later, in a joint meeting, the two towns' councilmen and aldermen agreed that West Orange could annex the 66-acre plot that started the dispute. Still unresolved: who'll get an approximately 320-acre adjoining tract, also for residential development.

*Upper left, Mayor Runnels, of Orange; lower right, Mayor Pearson, of West Orange.



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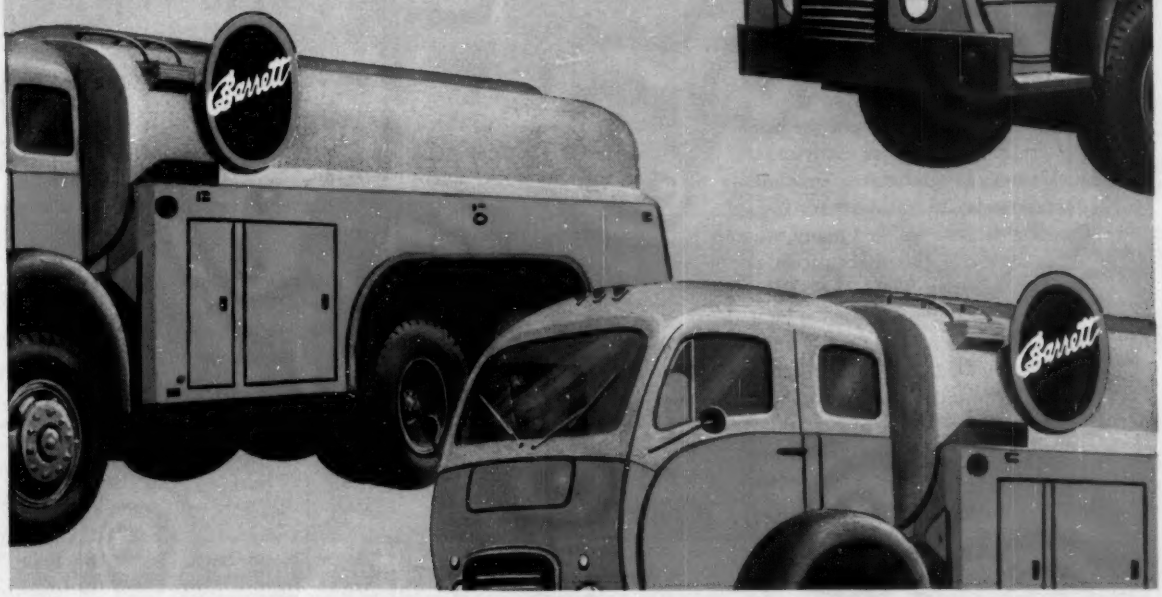

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JUDGE TUCKER: At employer's risk, even voluntary activities.

LEGAL. . . . . .

Personal Antitrust: Tougher enforcement of Sherman antitrust statutes on the individual level may be in store if a bill proposed by Sen. Hubert Humphrey (D., Minn.), chairman of a Senate Small Business subcommittee, is passed. Humphrey claims that corporation officials under present laws have little reason to fear punitive action for antitrust violations. He states that courts and juries are reluctant to declare a person a criminal for violating the laws. Says Humphrey: "Because of this difficulty, the bill I am introducing provides civil penalties that do not brand violators as criminals nor involve the stigma that attends indictment and conviction."

•

Volunteers' Injuries: Chemical companies organizing voluntary activity groups for employees may be liable for injuries sustained in those activities if a Chicago circuit court ruling is generally accepted. The ruling was made in a suit brought by an employee of Sinclair Research Laboratories, Inc. (Chicago), seeking compensation for loss of eyesight allegedly resulting from donation of blood to an employee blood bank. Judge B. Fain Tucker ruled last week that the company is responsible, that the employee's injury was incidental to his employment and therefore compensable.

Jesse Sheets, the employee, in 1953 gave blood for the wife of another employee through a "walking blood

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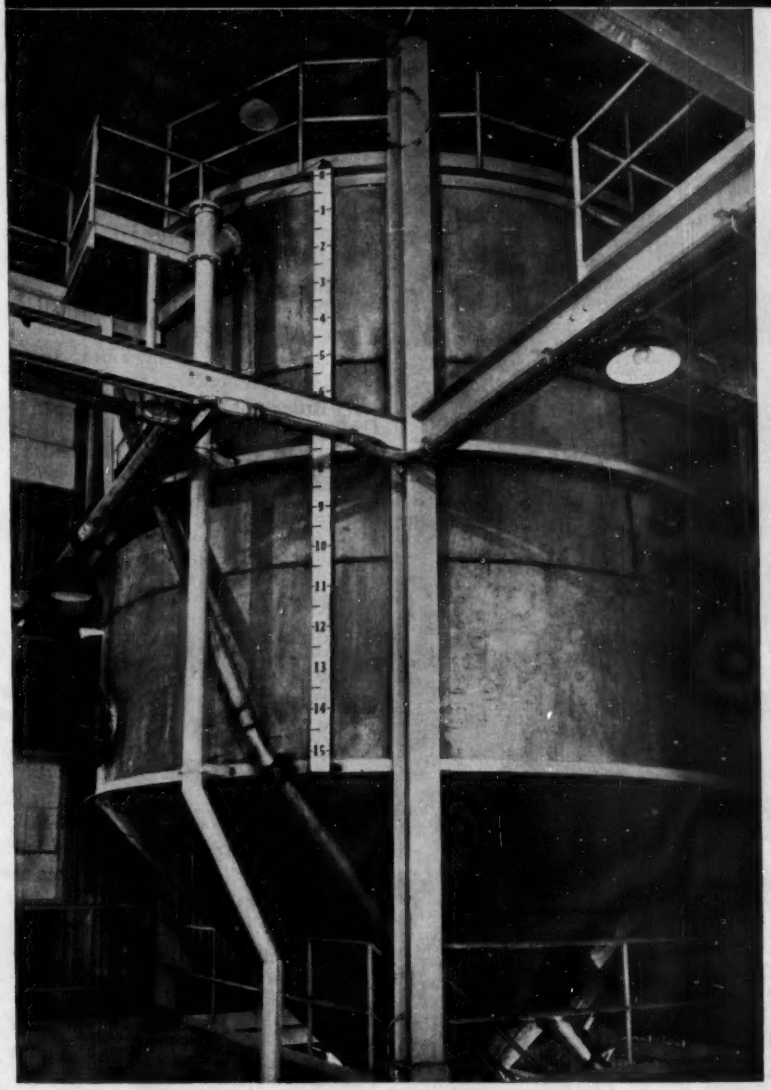
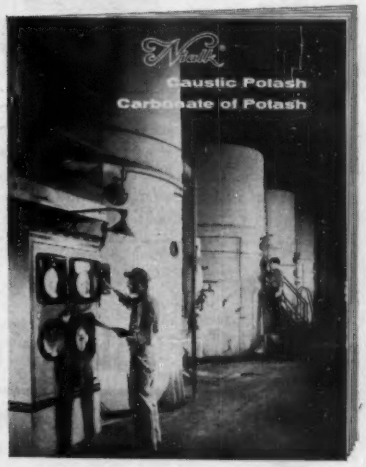


From this huge central storage silo, NIALK Carbonate of Potash is fed to all loading points for filling bags, barrels and hopper cars.

Niagara is setting top standards in the production of carbonate of potash. From raw material to finished product, NIALK chemicals pass through scrupulously clean processing equipment to spick-and-span containers. Quality checks are performed at every stage of the process to protect purity, guarantee uniformity.

These modern facilities and methods, coupled with Niagara's long production experience and reputation for quality, are your assurance of dependability in NIALK Carbonate of Potash. Your products and processes will benefit from this quality protection.

Send for free illustrated booklet, NIALK CAUSTIC POTASH, CARBONATE OF POTASH, *containing valuable data on the use and handling of these chemicals.*



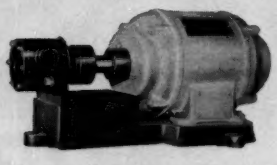
HOOKER CHEMICALS & PLASTICS

NIAGARA ALKALI DIVISION
HOOKER ELECTROCHEMICAL COMPANY
4739 Buffalo Avenue, Niagara Falls, New York

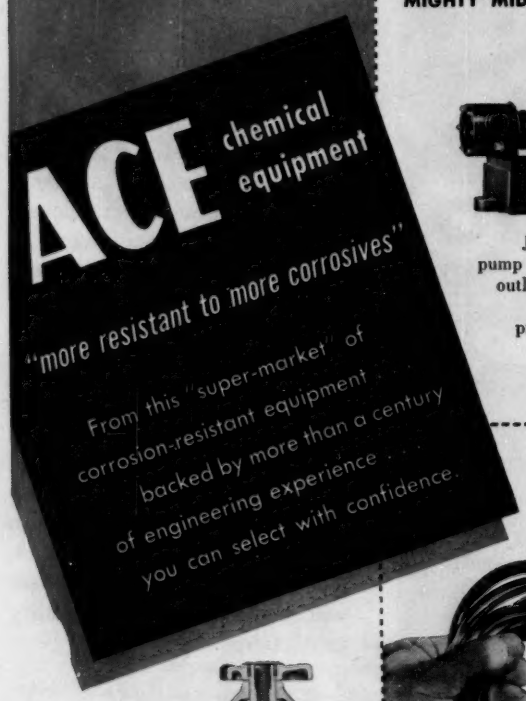
FOR HOT CORROSIVES:
ACE TEMPRON

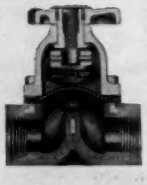
Heat-resistant nitrile hard rubber pipe handles inorganics at 250-275 deg. F. . . . also resists wide range of organic chemicals at room temperature. Sizes 1" to 8", *Bulletin 96-A.*

MIGHTY MIDGET
for pumping acids



Jabsco neoprene-impeller pump made of Ace hard rubber outlasts, out-pumps anything in its pressure, size and price class. Capacity from 15 gpm. at 22 ft. head to 5 gpm. at 72 ft. head. *Bulletin 97-A.*


ACE chemical equipment
"more resistant to more corrosives"
From this "super-market" of corrosion-resistant equipment backed by more than a century of engineering experience you can select with confidence.



VALVES
for all-plastic piping systems

Trouble-free plastic diaphragm valves . . . choice of general-purpose rubber-plastic blend, Ace Parian (polyethylene) or Ace Saran. Handles most corrosive chemicals and food ingredients. Sizes ½" to 2", 50 psi. at 77° F. *Bulletins 80 and 351.*

1001 USES *for ACE-FLEX Tubing*

Excellent chemical-resistant, all-purpose flexible plastic tubing. Sparkling clear, easy to clean, odorless, non-toxic, can be steam-sterilized. ⅛" to 1" ID. *Bul. 66.*

ACE rubber and plastic products

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

ADMINISTRATION . .

bank" organized among the laboratory personnel. Soon afterward, he permanently lost sight in one eye as the result of edema of the retina, attributed to his blood donation. An arbitrator for the State Industrial Commission upheld Sheets' application for compensation, but the commission later reversed the decision and Sheets appealed to the circuit court. Judge Tucker ruled that since the blood bank was organized through the efforts of a company personnel man, even though voluntary, it brought participation within the scope of employment. The judge ordered compensation of $34.20/week for 140 weeks.

•

Tax Validity: If an injunction suit brought by Koppers Co., Inc. (Pittsburgh) is successful, patterns of state use-tax laws may be in for revision. Koppers is challenging the validity of the Illinois use-tax act in an injunction suit filed in Springfield circuit court, seeks return of $2,196.44 in paid use-taxes on the grounds that the act is unconstitutional in not applying equally to all. Koppers named as defendants the state director of revenue and the state treasurer. A similar suit has been brought by the Santa Fe Railroad.

LABOR . . . . . .

Not So Simple: Three labor relations disputes—all involving complex issues, and two of them stemming from chemical process plants—are heading for review by higher courts. The U. S. Supreme Court has agreed to consider the legality of "slowdowns" that accompany collective bargaining; the Dept. of Commerce is urging that the Supreme Court hear arguments on whether a company that wants to give its employees a stock purchase plan has to negotiate the details with the employees' labor union; and the defendants in a Minneapolis suit involving alleged company-union conspiracy have served notice of appeal to the circuit court in St. Louis.

•

Backed by Industry: Support is forthcoming for the measure introduced in Congress by Rep. Thomas Jenkins (R., Ohio) to cut red tape for employers in reporting wage data to the federal government. The bill has been endorsed by the Commerce &

You'll make money on chemicals this year!

Regardless of the type of business you're in—if you're successful, chemicals will contribute something to your profits. Perhaps your chemical profits will be in the form of processes that cut costs or make your products better; perhaps they will be in components—like plastics, for instance—that will make your products more saleable; perhaps they will be in a form which brings something entirely new to your business. But, in one way or another, chemicals will mean profits for you—for only the chemical industry supplies *all* other industries.

Chances are you'll make more and more profits as the result of chemical progress in the years ahead. New chemical plant construction for 1956 and 1957 alone is estimated at $1.6 billion. Chemical sales which hit $21 billion in 1955 are expected to increase another 50% within the next ten years. And every other industry will profit by this progress!

In marking the observance of the third annual Chemical Progress Week, Columbia-Southern reminds you of the opportunities which the chemical industry will be bringing your way.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

IN CANADA: Standard Chemical Limited and Its Commercial Chemicals Division

CHLORINE, ALKALIES AND RELATED CHEMICALS

•

OFFICES IN PRINCIPAL CITIES

mixing the Day way at Goodyear.....

DAY BLENDERS . . . selected by the Goodyear Tire & Rubber Co. because these blenders are best suited for their new dry-mixing method for Vinyl compounds. Hundreds of other manufacturers all over the country are profiting from the long, dependable service of these blenders.

Designed for fast, efficient operation, Day Blenders can be equipped with a variety of agitators for your specific product. Anti-friction bearings, metallic seals, spray pipes, flush valves are available as optional equipment.

Photo shows two of many Day Blenders being used at the Goodyear Tire & Rubber Co. for mixing a variety of compounds.

Day Blenders are available in capacities from one cubic foot to 2300 cubic feet. Plain, galvanized or stainless steel tanks. Jacketing is optional. Write for Bulletin 800.

FOUNDED 1887

in mixing equipment DAY *means longer life span*

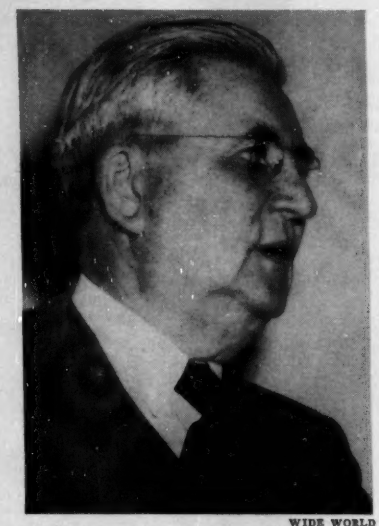
THE J. H. DAY COMPANY

4932 BEECH ST., NORWOOD, CINCINNATI 12, OHIO
Division of Cleveland Automatic Machine Company

Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products.

Eastern Canada: Brantford Oven & Rack Co., Ltd., Brantford, Ontario
Western Canada: British Canadian Importers, Vancouver, British Columbia
Mexico: T. de la Pena e Hijos, S.A., Nazas 45-A, Mexico 5—D.F.

ADMINISTRATION. .



WIDE WORLD

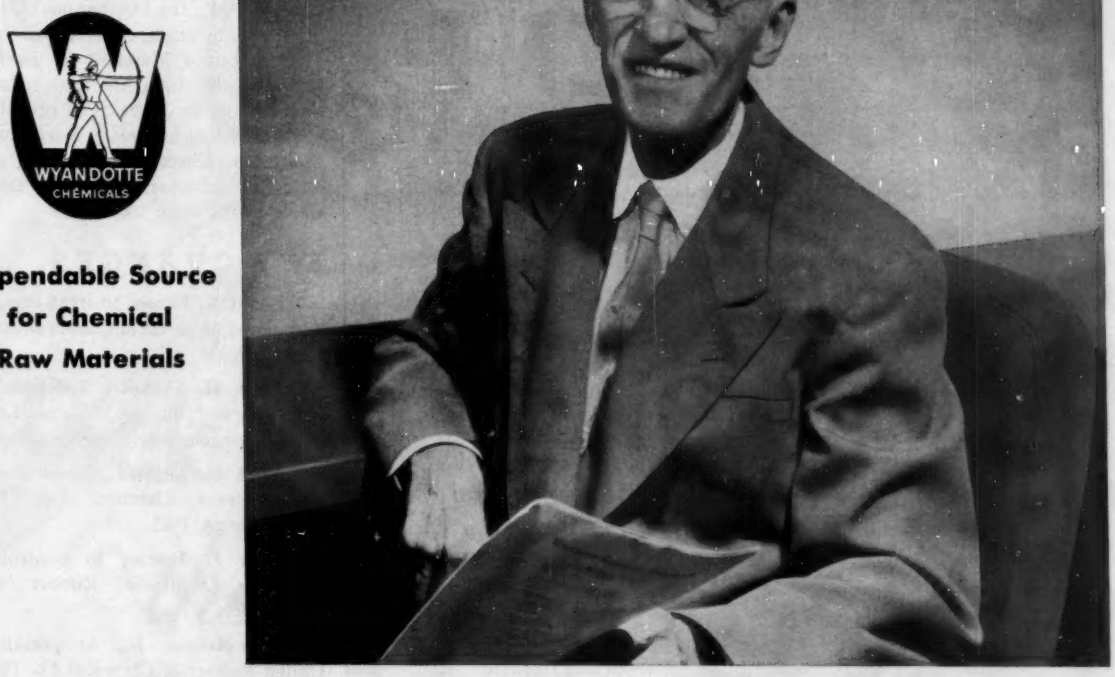
REP. JENKINS: For employers, much less paper work on wage records.

Industry Assn. of New York, which praises the Jenkins scheme as one that would simplify accounting procedures and save money both for industry and government. The plan calls for consolidating reports to the Social Security Administration and to the Internal Revenue Service and for putting those reports on an annual—rather than quarterly—basis.

•

Two Signings, Two Strikes: Peaceful settlements—one reached a week early, the other after three months of parleys—came in latest wage negotiations between Phillips Chemical and the Oil, Chemical & Atomic Workers (AFL-CIO) at Pasadena (near Houston), Tex., and between Davison Chemical Co. (division of W. R. Grace & Co.) and the International Chemical Workers Union (AFL-CIO) at Bartow, Fla. At the petrochemical plant, a general wage rise of 6% (minimum increase 15¢/hour) is retroactive to Feb. 21; at the phosphate plant, the new two-year agreement calls for wage hikes ranging from 10¢ to 13¢/hour.

But at two other locations, industrial relations are less harmonious. At Camilla, Ga., an attempt by United Mine Workers Union to organize workers at fertilizer and cottonseed oil processing plants may lead to a test of the kind of ordinance—adopted by several Southern cities—that prohibits unionizing without a license. UMW organizer William Duty was



Wetalene's President W. J. Mangold bases his business on quality products.

Dependable Source for Chemical Raw Materials

"Wyandotte's Pluronics help us keep our quality high"

— W. J. Mangold, president, Wetalene Laboratories, Inc., Columbus, Ohio

"We have to make quality products to meet competition," says W. J. Mangold, president of Wetalene Laboratories, Inc. "That's why we're constantly looking for ways to improve our quality.

"When Wyandotte introduced the PLURONICS,* we recognized in them a balance of properties that was not available in other surfactants. We thoroughly tested and evaluated those PLURONICS that had the greatest potential for us.

"We found that in *Only-Wun*, our complete compound for automatic washers, the PLURONICS gave us increased soil removal and whiteness retention, and enabled us to control the sudsing. The PLURONICS also produced a more free-flowing product. In addition, we were able to eliminate some of the compounding operations required with our previous nonionic, with resultant labor and equipment savings.

"In addition to the PLURONICS, we also use Wyandotte KREELON* CD and CARBOSE.* We have found Wyandotte products quite compatible, not only with each other, but with all products compounded with them.

"We also appreciate the service behind these products. When we need additional materials, we can schedule our production on Wyandotte's word that the materials will be here."

Have you looked into the possibilities of the PLURONICS in *your* business? The PLURONICS have already been used successfully in many fields: viscose rayon and cellophane, metal cleaning, boiler descalants, mechanical dishwashing, and dye leveling — to name a few. Our experience in these and many other fields is at your command. Just write us, giving details of your expected applications. We'll send you pertinent data and samples for your evaluation. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

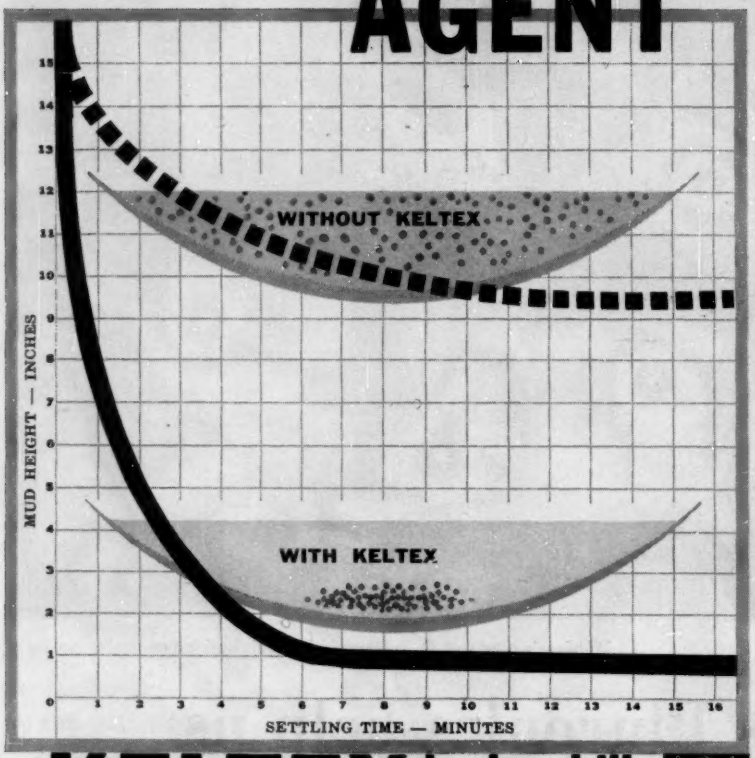
*REG. U.S. PAT. OFF.

Wyandotte CHEMICALS

HEADQUARTERS FOR ALKALIES

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA • CHLORINE • MURIATIC ACID • CALCIUM CARBONATE • CALCIUM CHLORIDE • GLYCOLS • CHLORINATED SOLVENTS SYNTHETIC DETERGENTS • OTHER ORGANIC AND INORGANIC CHEMICALS

Achieved! A new kind of FLOCCULATION AGENT



KELTEX hydrophilic colloid

Provides rapid and effective separation of finely divided organic and inorganic particles from liquid suspensions

This highly efficient new flocculating agent is finding wide usage in many diverse applications. In the clarification of sugar juice, wine, beer and vinegar, Keltex sharply accelerates the sludge settling rate and markedly improves the clarity of the supernatant liquid. Further Keltex is nontoxic, will not adversely contaminate solid-liquid systems.

Keltex may be used for the flocculation of suspended ore particles in ore slurry and slime separation; for speeding up settling rates of organic solids in waste and sewage treatment; and for other processes or products that require efficient separation, most readily achieved by rapid flocculation of suspended particles. Easy to use, Keltex is soluble in cold or hot water. Economical, too, for only a few parts of Keltex per million are required.

If your process or product requires rapid flocculation of finely divided solids in liquids for faster settling and improved clarity of the supernatant liquid, Keltex merits your immediate consideration.

Yours On Request: Keltex Technical Data Sheet and Keltex sample, without cost or obligation. Write or phone today.

KELTEX®

a product of **KELCO** company

120 Broadway, New York 5, N. Y.
20 N. Wacker Drive, Chicago 6, Ill.
530 W. Sixth St., Los Angeles 14, Cal.
Cable Address: Kelcoalgin—New York

ADMINISTRATION . .

arrested under such an ordinance after workers at the two plants went on strike in an attempt to win recognition for collective bargaining. And at El Dorado, Ark., the International Union of Operating Engineers (AFL-CIO)—picketing since March 2 in the first strike at the Lion Oil Co. refinery there during its 33 years of operation—charged that last year's merger with Monsanto Chemical has hurt the concern's labor relations. The union wants a 6% wage increase.

KEY CHANGES . . .

Richard A. Lenon, to treasurer, International Minerals & Chemical Corp. (Chicago).

Francis H. McAdoo, Jr., to vice-president and director, Warner-Lambert Pharmaceutical Co. (New York).

Arnold C. Ott, to vice-president, Pedlow-Nease Chemical Co., Inc. (Lock Haven, Pa.).

Robert J. Freeze, to controller, American Synthetic Rubber Co. (Louisville).

Oscar Nelson, Jr., to president, United Rubber & Chemical Co. (Wilmington, Del.).

George M. Walker, to executive vice-president, **B. J. C. van der Hoeven,** to general manager, and **Carl H. Pottenger,** to vice-president, Chemical Division, Koppers Co. (Pittsburgh).

Jay H. Forrester, to president, newly formed merger of Indoil, Pan American, and Hidalgo Chemical companies, all subsidiaries of Standard Oil Co. of Indiana (Chicago).

Edward J. Thomas, to chief executive officer, and **Robert S. Wilson, Paul E. H. Leroy, Russel R. DeYoung,** to vice-presidents, Goodyear Tire and Rubber Co. (Akron, O.).

Harry N. Huntzicker, to vice-president, American-Marietta Co. (Chicago).

Edward D. Toland, Jr., to treasurer, Monsanto Chemical Co. (St. Louis).

Harrison C. Givens, Jr., to vice-president, Celanese International Corp. (New York).

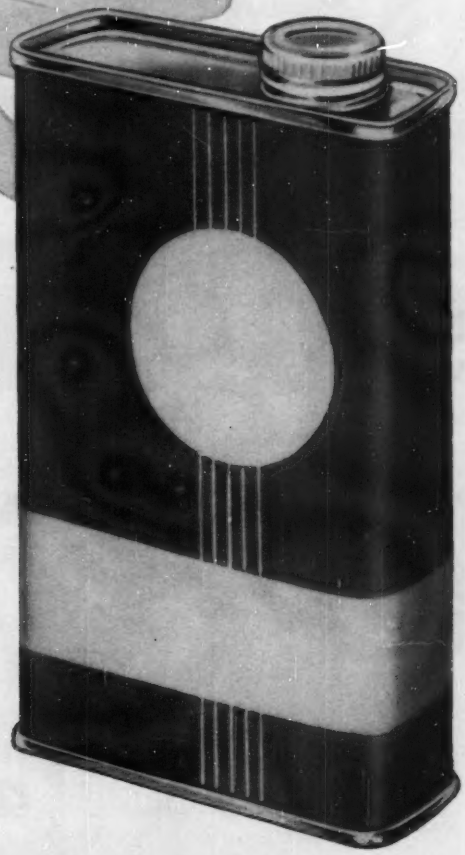
DIED . . . . . .

Herbert A. Faber, 72, board chairman, Formica Co. (Cincinnati), at Cincinnati.

"Pick me"

they say—

and our "F" style cans will do a job for you, too!

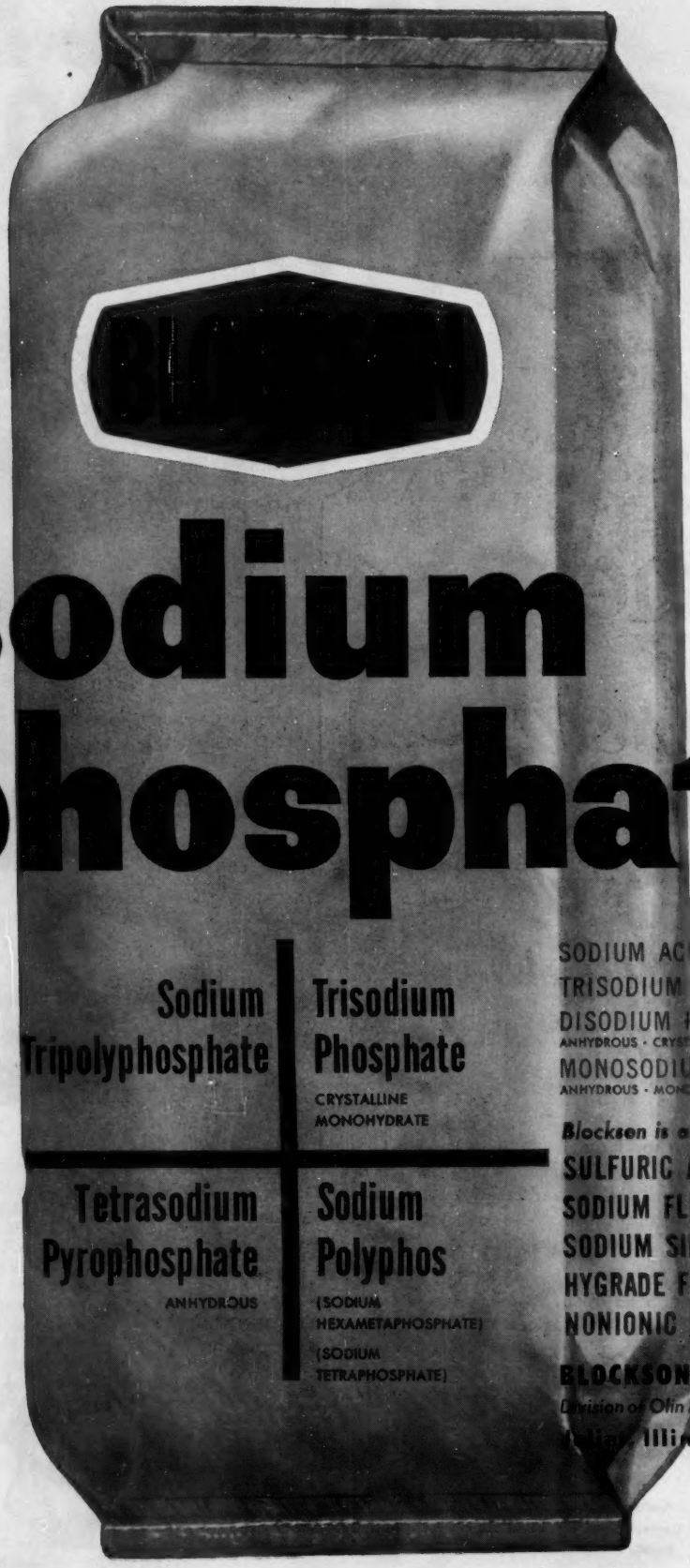


Your package has to "speak up" for sales, or it doesn't stand a chance in today's fast competition. That's why Continental's "F" style cans are the choice of so many manufacturers of waxes, polishes and other petroleum products. For, in addition to sturdy, easy-to-use construction, these containers offer you color and brilliance that only Continental master lithographers can achieve.

We'll start things off right by delivering all the "F" style cans you need, exactly when you need them. Sizes from four-ounce (spout top) to one gallon. Then, if you want help with research or engineering, it's available anytime as part of our Tailor-Made Package Service. Why not let "F" style cans do a selling job for you? Call soon.

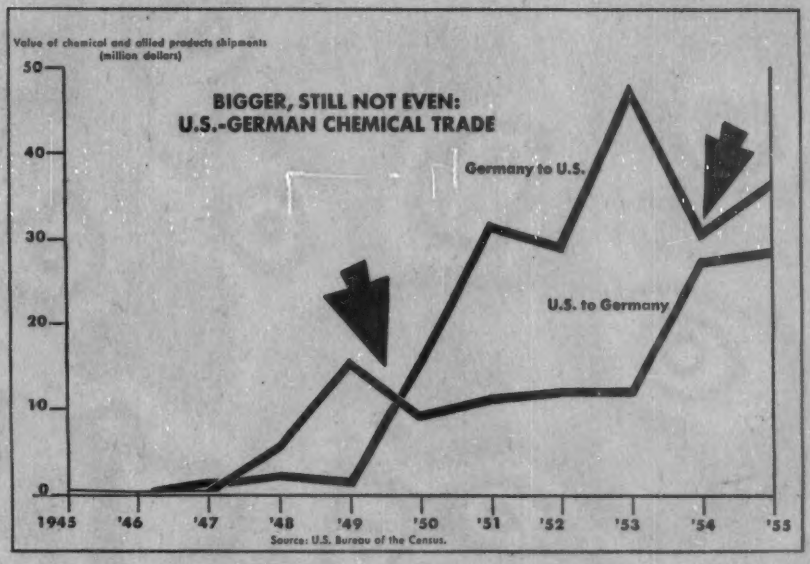
CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

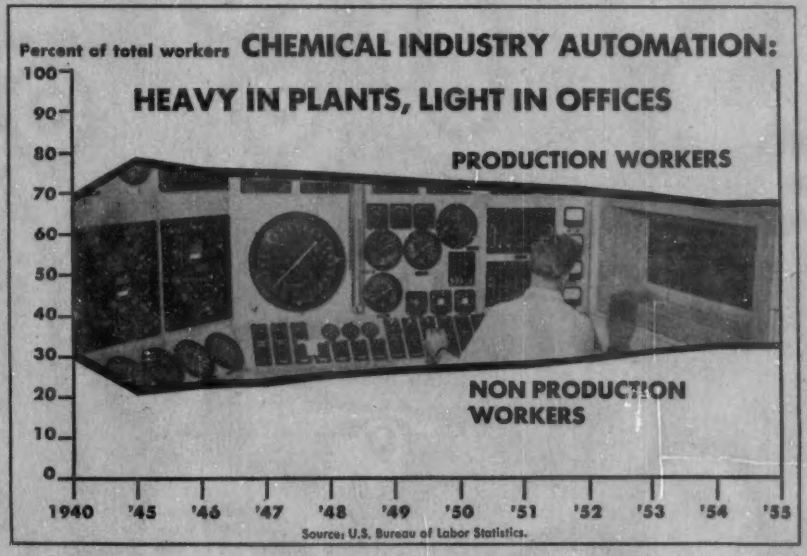

sodium
phosphates
Sodium Tripolyphosphate
Trisodium Phosphate
CRYSTALLINE
MONOHYDRATE
Tetrasodium Pyrophosphate
ANHYDROUS
Sodium Polyphos
(SODIUM HEXAMETAPHOSPHATE)
(SODIUM TETRAPHOSPHATE)
SODIUM ACID PYROPHOSPHATE
TRISODIUM PHOSPHATE CHLORINATED
DISODIUM PHOSPHATE
ANHYDROUS · CRYSTALLINE
MONOSODIUM PHOSPHATE
ANHYDROUS · MONOHYDRATE
Blockson is also a major producer of...
SULFURIC ACID
SODIUM FLUORIDE
SODIUM SILICOFLUORIDE
HYGRADE FERTILIZER
NONIONIC SURFACTANT-TEOX 120
BLOCKSON CHEMICAL COMPANY
Division of Olin Mathieson Chemical Corporation
Illinois
CHEMICAL PROGRESS WEEK-APRIL 23-28

Charting Business

CHEMICAL WEEK
April 21, 1956



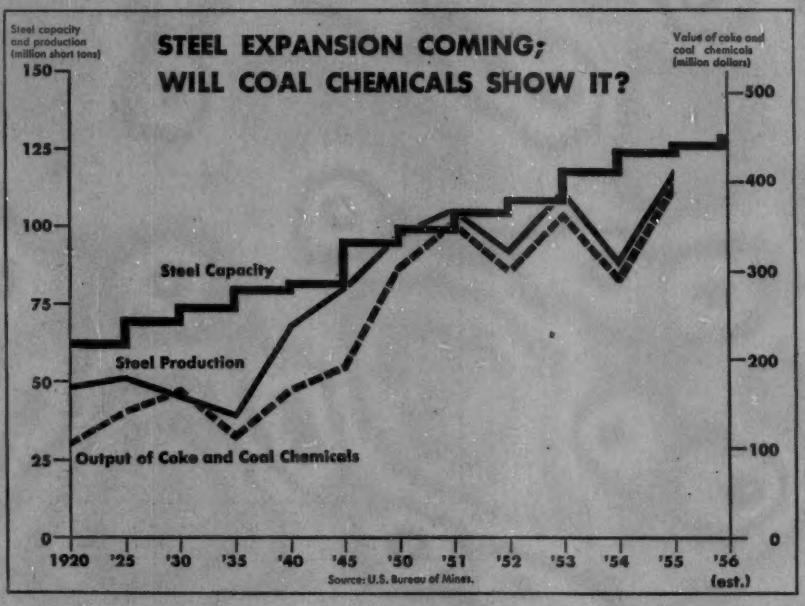
ROLLING in bigger volume than ever before in both directions, chemical trade between the U.S. and Germany is now a major factor in world commerce as well as a stern reality for many U.S. producers. Westbound traffic from Germany to the U.S. is again in the ascendancy, just as before World War II, although it was nearly equalled by the eastbound flow in 1954. Figures include trade with East Germany, which—in the past four years—bought $54,975 worth of U.S. chemicals, sold us $9.3 million worth.



IT'S RISKY to generalize on how much manpower can be displaced by machinery, but employment data over the past decade seem to indicate that U.S. chemical companies are pushing automation more ardently in their plants than in their offices. Several larger firms have installed "electronic brains" and similar office aids; but the actual and relative number of administrative and other salaried employees has nevertheless been gaining steadily.

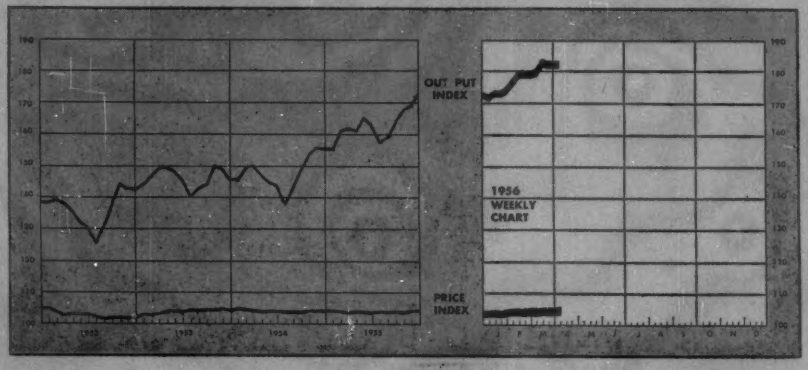
Charting Business

(Continued)



THE STEELMAKERS are expanding again, are now seeking financing or letting contracts for $3 billion worth of projects that'll bring total U.S. steel capacity up to an estimated 140 million tons/year by about 1958. If the steel mills step up production accordingly, there'll be a proportionate increase in output of coke —and hence a rise in production of chemicals from coal. While steel capacity doubled from 1920 to '55, value of coal chemicals sold jumped up by 270%.

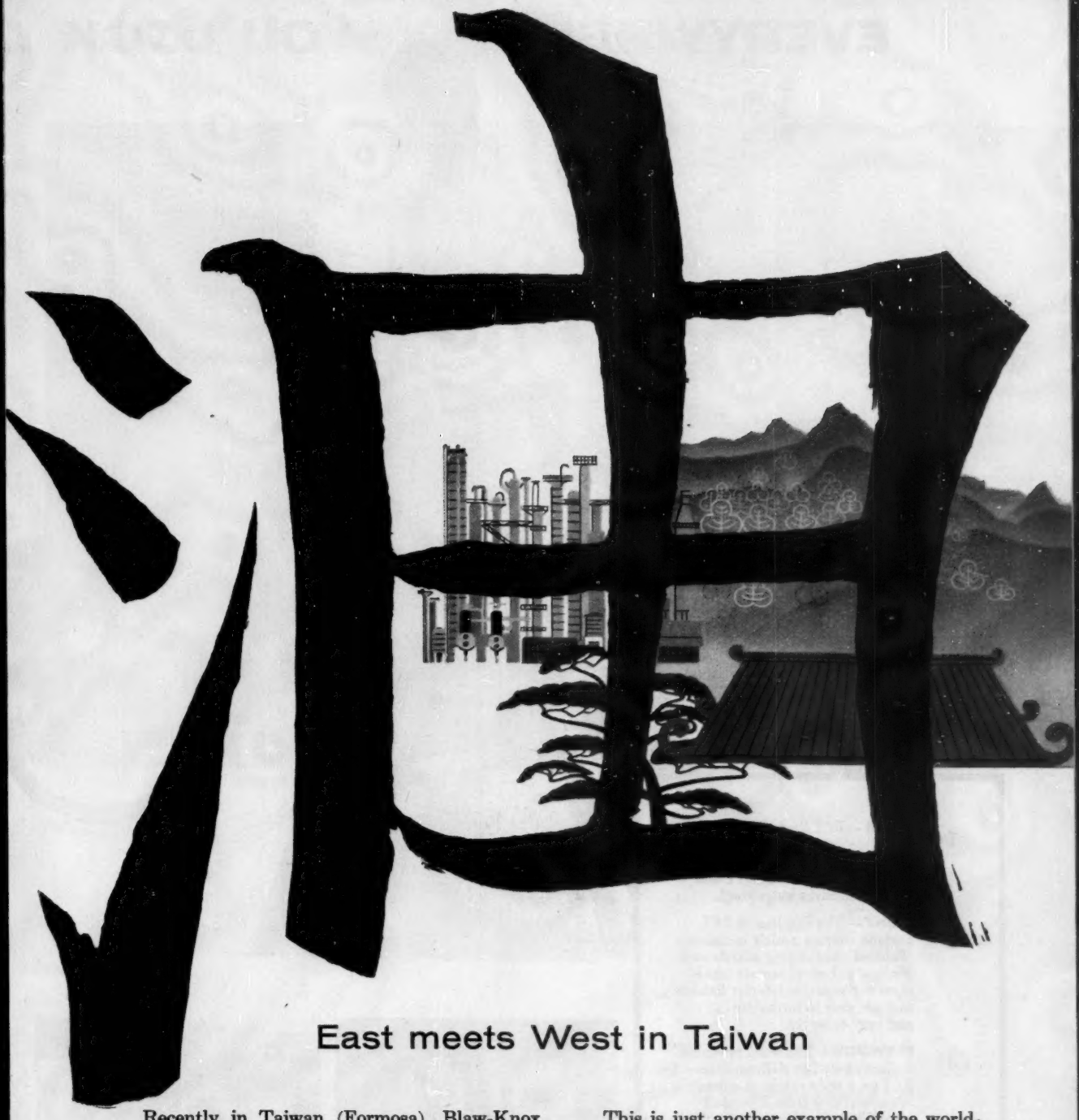
BUSINESS INDICATORS



WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	183.5	183.5	161.4
Chemical Week Wholesale Price Index (1947=100)	105.8	105.7	104.2
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	507.5	515.0	383.7

MONTHLY—Foreign Trade

(million dollars)	Exports			Imports		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	89.8	97.1	79.8	26.4	21.6	20.6
Coal-tar products	5.8	5.5	6.5	4.4	4.4	3.0
Industrial chemicals	14.9	14.7	14.7	8.5	7.0	5.1



East meets West in Taiwan

Recently in Taiwan (Formosa), Blaw-Knox placed on stream the first Catformer in the Orient for its owners, the Chinese Petroleum Corporation. This plant was designed and procured by Blaw-Knox's Chemical Plants Division, who also supervised erection which was completed in the record time of four months. Chinese labor under the direction of Chinese engineers and skilled technicians performed the actual construction work.

This is just another example of the world-wide achievements of Blaw-Knox engineers, who are ready to help you in the engineering, procurement and construction of a single unit or a complete refinery.

50th Anniversary
1906-1956

BLAW-KNOX COMPANY
Chemical Plants Division
Pittsburgh 30, Pa. • Chicago 1, Ill.
Birmingham, New York, Philadelphia, San Francisco, Washington, D.C.

油, yu^2—oil

EVERYWHERE YOU LOOK .

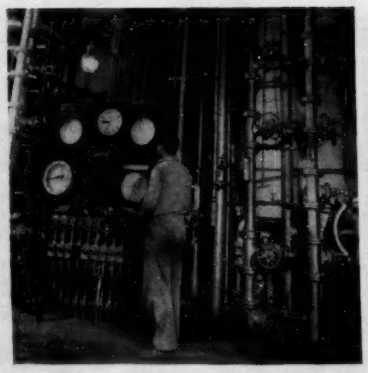
1 **PAPER** — RCI *Beckamine* urea-formaldehyde resins add wet strength, improve the wet rub of starch-clay coatings, and make starch adhesives waterproof.

2 **PAINT** — The full line of RCI surface coating resins includes *Wallkyd* pure drying alkyds and *Wallpol* polyvinyl acetate emulsions for superior interior finishes that are easy to formulate . . . and easy to apply.

3 **PLYWOOD** — The wood products industry gets fast delivery from RCI on a wide range of adhesives . . . everything from *Plyophen* phenolic to *Plyacien* protein glues.

4 **PLASTICS** — Countless products — like sport car bodies, luggage, fishing rods — gain production and sales advantages when made of reinforced RCI *Polylite* polyester resins or *Plyophen* phenolic resins.

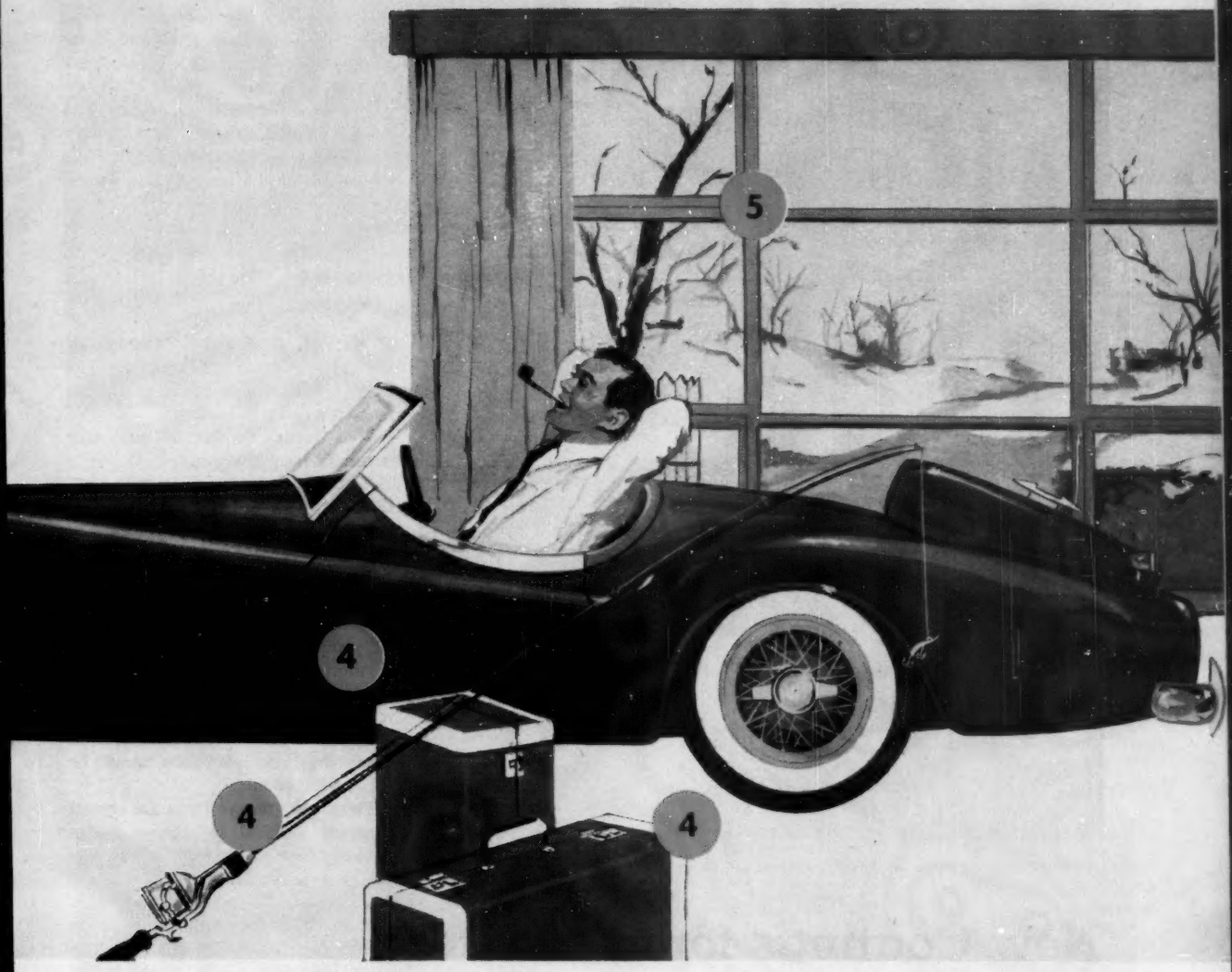
5 **LUMBER**—RCI pentachlorophenol is an important ingredient of easily-applied preservatives for wood. It helps make wood exposed to weather last for many years.



AT RCI — Operator checks instrument panel of phenolic resin kettle in our Seattle plant. Reichhold phenolic resin adhesives are carefully formulated to give a waterproof bond in "hot pressed" fir plywood panels.

Everywhere you look — Fir plywood bonded with phenolic resin adhesives adds extra rigidity at low cost in new home sheathing. Plywood manufacturers count on RCI for technical help in developing superior glues.

. . . RCI is in the Picture!



● *Paper, paint, plastic and wood products.* Somewhere in *your* production, too, RCI fits right into the picture. Or should soon! We think so because RCI offers a list of top quality resins and basic chemicals. A list that's growing all the time. These materials are made in plants all over the country for fast delivery by truck or rail.

Take just one example . . . phenol. As a leading supplier of phenolic resins, we've used a lot of phenol for years.

Today we make it ourselves. And sell it, too. As a customer for our phenol you benefit from both fast service and the careful control we exercise in manufacturing this versatile chemical. We *have* to be careful . . . to protect the uniformity of *our own* resins.

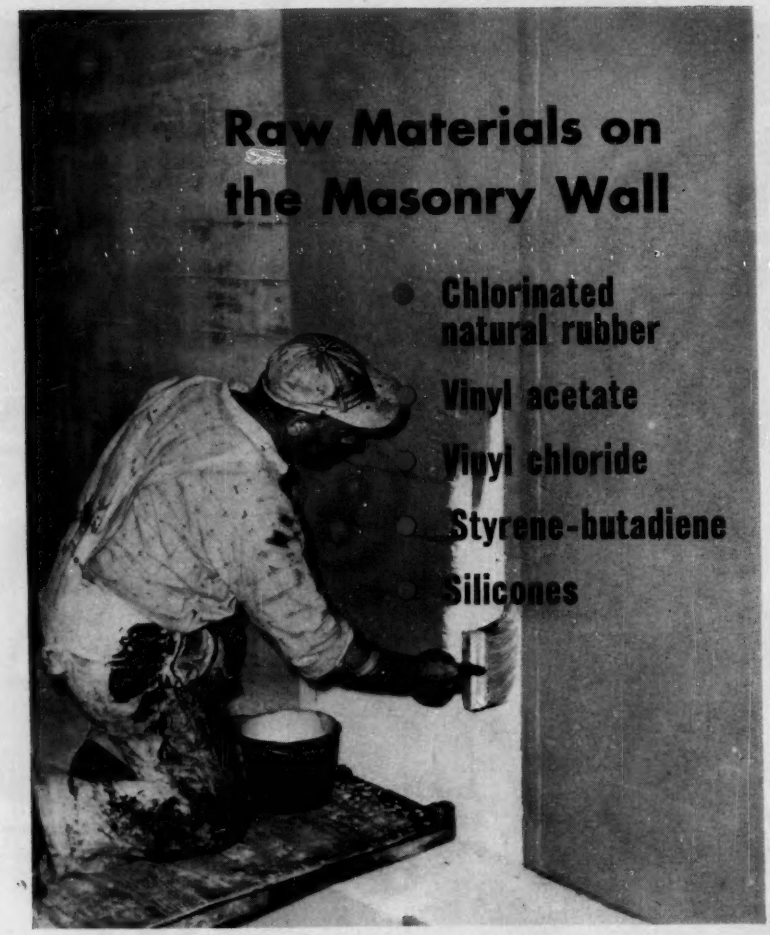
Next time you have a supply problem (or a technical problem), take a look at RCI. See where our production can fit into your picture with fast delivery on any of the quality-controlled materials listed below.

Creative Chemistry . . . Your Partner in Progress

RCI **REICHHOLD**

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.

Synthetic Resins • Chemical Colors • Industrial Adhesives • Plasticizers
Phenol • Formaldehyde • Glycerine • Phthalic Anhydride
Maleic Anhydride • Sodium Sulfite • Pentaerythritol • Pentachlorophenol



BRUSHWORK: New materials with new properties make . . .

New Coatings for Concrete

When a man builds a house, he usually thinks of masonry—concrete, stucco, brick—as a wise investment because of its good appearance, durability and low upkeep. It's often quite a blow to him to learn that masonry needs painting. Paint producers are hoping that a rash of new products for the masonry owner will awaken him to his responsibilities.

This reluctance to face the facts—that most masonry should be painted—has heretofore been the major factor in keeping the sales factor of masonry paints well below what it might be.

On home exteriors*, where sales have likely come closest to maximum potentials (and are still not over 50% of possible), the 1955 gallonage probably didn't exceed 4.25 million—worth perhaps $20-25 million. For interior application—basement floors and walls—there are virtually no estimates of sales potential, and the guesses as to actual usage are most generally: "nothing like what it ought to be."

Naturally, with the exterior paint market the largest, its competition is severest. It's now a battle between such solvent-thinned materials as styrene-butadiene† and chlorinated rubber, and water-emulsion products made with acrylics, polyvinyl acetate, and styrene-butadiene. Even multicolor nitrocellulose lacquers have been used on masonry in some areas.

For interiors, particularly floors, styrene-butadiene solvent coatings and those based on chlorinated rubber have the cream of the market. But due to lengthy preparation necessary before they're used, and because of their high solvent odor, they're in for some rough competition.

One of the hottest new products on the market is Luminall Paints' (division of National Chemical & Manufacturing Co., Chicago) new concrete floor paint. It has three properties that could make it a real trend-setter:

- It doesn't require an acid etch before floor application.
- It's water-thinned—virtually odorless.
- It dries to "walk on" hardness in less than one hour.

Key to the new material is a combination-latex vehicle (including acrylics and other materials) called Acrypolyrene.

Another coating with big potential is a vinyl toluene resin paint under development by Goodyear. It's said to have far less odor than conventional solvent-type concrete paints, should be commercial soon.

Thick and Glossy: There are several apparent physical differences distinguishing floor paints from stucco (exterior) finishes. The floor paints are enamels—produce a thick, glossy film, high in resin content. Stucco paints have a high solids content, which is much less resin, more pigment and flatting agents.

For exterior usage, there has been increasing emphasis on silicones—either alone, to produce colorless water-repellent surfacing, or in combination with other paint elements. The styrene-butadiene (solvent type) materials, though generally less compatible with other paint resins than chlorinated rubber, can be used with silicones to enhance the properties of both. The silicones (e.g. General Electric's SC-50) also show up as water repellents in emulsion-type masonry paints.

Leading suppliers of the copolymers for solvent paints are Goodyear and Marbon (chemical division of Borg-Warner Corp., Chicago); top suppliers

*Highway paints (for the dividing line stripes) make up part of the market for concrete paints. About 2 million gal., worth $12 million, are used in the U.S. annually.

†Styrene-butadiene copolymers for emulsion paints are about 60% styrene, 40% butadiene. For solvent paints, the ratio is about 85% styrene to 15% butadiene. Emulsions give a flexible film; solvent types give a brittle film.

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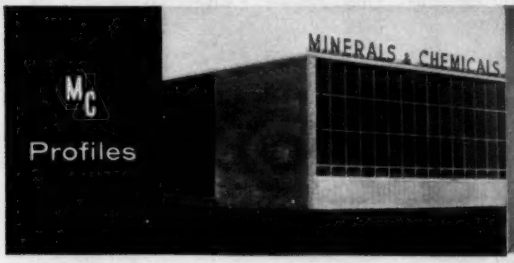

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of the chlorinated rubber are Du Pont and Hercules Powder. (Emulsion paints, because they have greater application in other areas—interior wall priming, finishing—than in masonry paints, are generally put in the wall paint classification.)

Well Grounded: For floor paints, the copolymer and chlorinated rubber resins now have the field virtually to themselves, with the copolymer most widely used. But these must be applied with care—typical instructions call for thorough washing of the floor with an alkaline polyphosphate, then "etching" with 10% hydrochloric acid, and a rinsing-drying step.

The paint is then brushed on quickly; it dries fast, by solvent evaporation. In the case of chlorinated rubber, such solvents as toluene, xylene, high-flash naphtha are used; for copolymers, these solvents are used 50-50 with mineral spirits. Still, there is considerable odor—hence Goodyear's work with the vinyl toluene.

Vinyl acetate-chloride resins, in solvents like methyl ethyl ketone, produce durable floor finishes, but there have been adherence problems, and their odor and cost often rule them out.

Epoxy and polyester finishes, exceedingly durable and resistant, "cure," rather than dry, by solvent evaporation. But addition of the catalyst is tricky; curing time is often long at room temperatures, and with some of the polyesters, achievement of a smooth finish is difficult. Several years ago, Sherwin-Williams developed a system to epoxy-coat concrete blocks as they were made.

Under Pressure: No matter what film former is used, no reputable firm now advertises that its paints can seal out water under hydrostatic pressure. Sealants applied from the inside are available for this purpose, but most firms recommend treatment of the outside of the concrete when it is being put down. Even the most carefully applied masonry paint, when exposed to water under pressure, will often fail, unless the concrete has been presealed.

It seems plain that, as heavy-duty paints, the masonry finishes have a deserved reputation as being tough to apply. Until they're made easier to put on, less "painty" in their characteristics, they're not going to be as popular and as widely used as their usefulness would suggest.

'BIG SURPRISE': Dutch Cleanser will step aside for Beads O' Bleach, as . . .

Dry Bleaches Hit 'Big Time'

On the night of May 26, 30 million TV viewers will see the debut of heavy-duty dry bleaches into the "big time." On that night, Purex Corp., Ltd., (South Gate, Calif.) will put Beads O' Bleach into its advertising center ring—the $100,000 jackpot quiz show "The Big Surprise"—replacing Dutch Cleanser.

By being the first to go national in the U.S. with a DDH (dichlorodimethylhydantoin) bleach, Purex is playing an important role in the battle of DDH producers.* This struggle began last October when the first producer, Wyandotte Chemical Corp. (Wyandotte, Mich.) was challenged by Theobald Industries (through a DDH-producing affiliate).

Each company was riding a favorite. Theobald was selling DDH to Colgate-Palmolive for its Pruf; Wyandotte was selling to Purex. In January, Wyandotte persuaded Purex that it should increase its volume and go national, making possible a 20% DDH price cut (from 50¢/lb. to 40¢/lb. in carload lots). Theobald has had to match Wyandotte's price, is waiting for Colgate's Pruf to go national, too, and make its lower price economical. (Says Theobald: "We aren't in pain, but we aren't getting rich.")

Birds of a Feather: Colgate reports it won't rush to follow Purex; it wants to know more about the market first. One reason Colgate is going its own way is that it is selling a different product: Pruf (like most DDH household products) is spray-dried by Theobald; Beads O' Bleach is a mechanical mixture of powdered DDH with a spray-dried, built detergent.

Purex, on the other hand, thinks it knows enough to go ahead now. An example of the sort of thing it has found out: heavy-duty dry bleaches sell best when supermarkets stack them with liquid heavy-duties.

Test-market data also persuaded Purex that the bleach should be offered in both glass and cardboard packages. Beads O' Bleach will be available in 18-oz. (39¢) and 33-oz. (69¢) cartons, and 6¼-, 12-and 19-oz. jars.

The most important test-market information, however, is the indication of sales to come. Purex reports that Beads O' Bleach has captured as much as 20% of all bleach business in some supermarkets.

*Canada will have a national dry bleach before the U.S. has one. Javex Co., Ltd. (Montreal) already has a national liquid bleach, will have a dry on sale across the Dominion this month.

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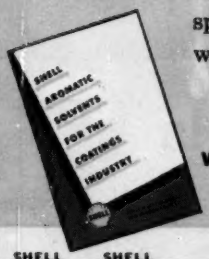
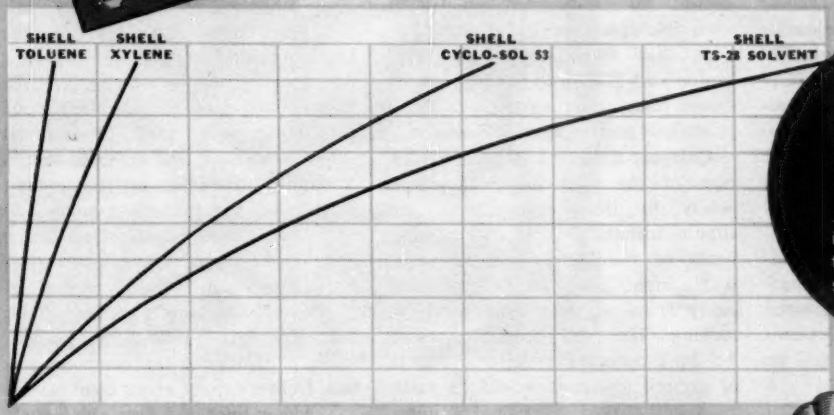


Write for your copy.



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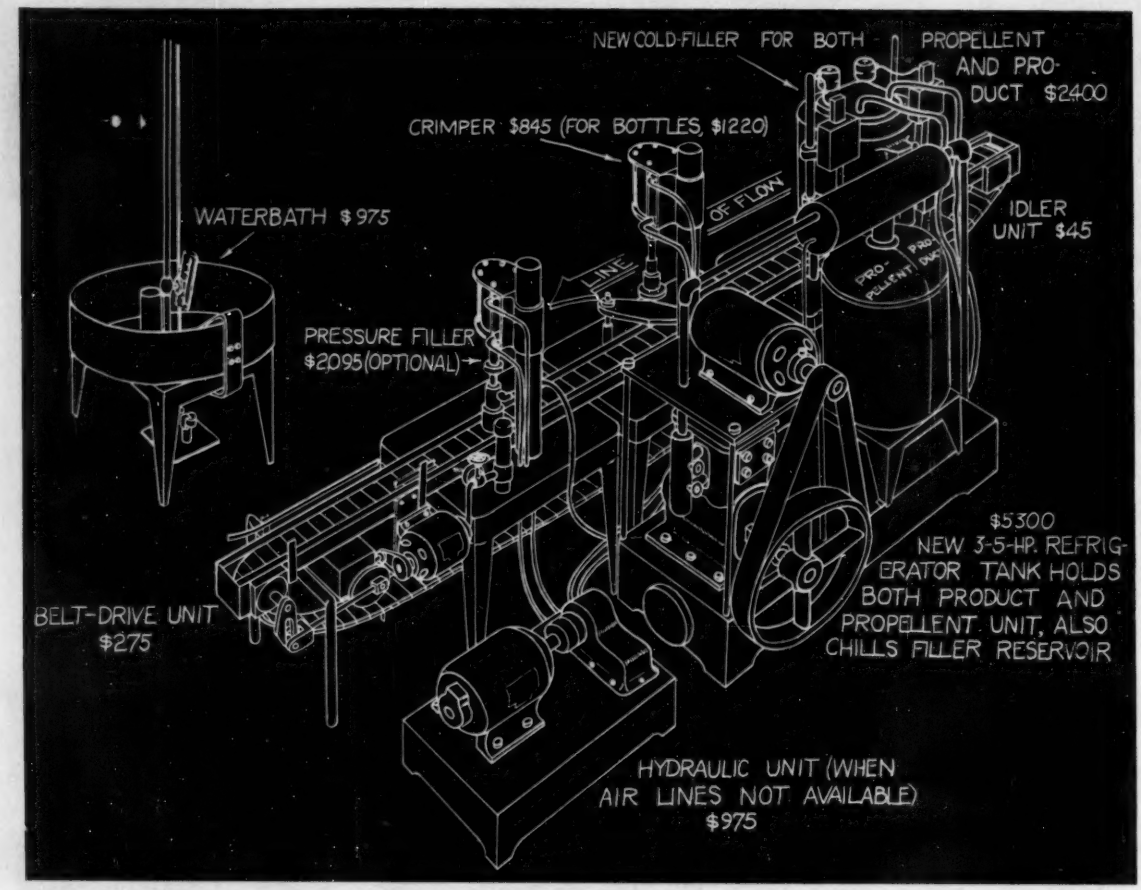
NEW COLD-FILLER FOR BOTH PROPELLENT AND PRODUCT $2400
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BELT-DRIVE UNIT $275
HYDRAULIC UNIT (WHEN AIR LINES NOT AVAILABLE) $975

Low-Cost Setup Cold-Fills Aerosols

Rushed to completion last week, just in time for the National Packaging show in Atlantic City, was Mojonnier Associates, Inc.'s (Franklin Park, Ill.) latest aerosol products filling line (CW Newsletter, March 10). Able to automatically fill up to 60 containers/minute, the line (see cut) comes complete with refrigerator, can be adapted to either cold-fill or pressure-fill, and will handle cans or bottles.

The new line is Mojonnier's (leading proponent of cold-filling) counterpitch to the low cost theme stressed by pressure-filling advocates. Depending on the type of equipment and its capacity, lines cost $10-12,000.

Big contributors to the lower price tag on the new line are two brand-new developments—a self-contained refrigeration unit for cooling both propellent and product, and a two-in-one cold-filler (using the firm's patented "electromatic" principle). An outside firm worked out the refrigerator, but Mojonnier adapted its own machinery for the filler.

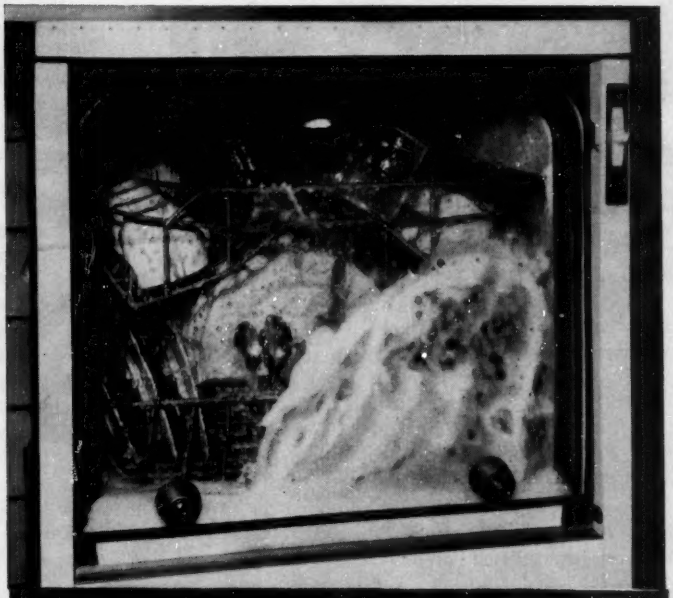
In their small sizes, both refrigerator and filler have a single, partitioned reservoir in which to chill both propellent and product.

Compact Capacity: Besides the low cost of the new lines, Mojonnier points to their compactness and simple installation. All the components of the system are less than 6 ft. high, and can be unlatched easily from adjoining equipment for moving. The new cooler (smallest, 3-5 hp.) occupies about 6 x 2½ ft. of ground space; it would fit easily behind the cold filler and crimper (*see cut*). The over-all length of the line illustrated is about 14 ft. (idler is 19 in. long; cold filler, crimper, pressure filler, and conveyor drive unit are in 36-in. units); over-all width is about 2½ ft. A small hydraulic unit, to operate the crimper and other units when compressed air lines aren't available, can be placed behind the filling line, too.

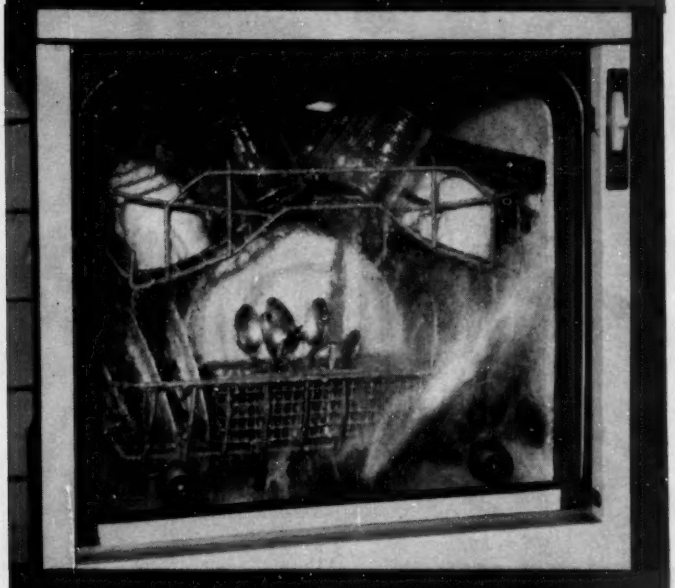
Filling capacity varies widely. With 16-oz. cans, the line shown can fill 10-20/minute; 15-25 12-oz. cans; 20-30 6-oz. cans; and up to 40 bottles a minute, depending on the amount of product and propellent going into each can. Other, slightly larger, systems—with larger refrigerators—can boost production well above this.

Although Mojonnier doesn't build the refrigeration portion of its line itself, it distributes the complete system. Delivery time: about eight weeks.

The new lines, the firm says, won't be for the giant firm, or for the big contract packager. But they do give the smaller specialties firm an opportunity to install a reasonably high-capacity, economically operated cold-fill line at low cost.



Conventional low-foam Detergent
Notice excessive foam 3 minutes after beginning of wash cycle.



TRITON CF-10
Notice how suds are controlled (after same length of time) for better dishwasher operation.

End Excessive Foam with High-Detergency TRITON CF-10

Detergents containing TRITON CF-10 do not foam excessively even when violently agitated. The result is that automatic dishwashers can do their job better, and kitchenware rinses clean without streaks or spots. At the same time, TRITON CF-10 has such excellent detergent properties that it effectively removes soil from the hardest-to-clean plastic ware. Investigate TRITON CF-10 for your cleaning compounds today.

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SOUTHERN STATES IRON ROOFING CO.

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PATENTS

For Soapless Scrubbing: Paraffin wax (40-60 parts by weight), a fatty acid (2-5 parts), and a water-soluble alkyl aryl sulfonate (60-40 parts) go into a new synthetic detergent bar invented by Allen Lewis for California Research Corp. (U.S. Pat. 2,734,870).

•

Varnish Vanishes: Mix hydrolyzed dextran, isopropyl alcohol and water, and you've got a varnish remover, according to Herman Nack and Leo Novak, who worked out the composition (U.S. Pat. 2,736,710) for the Chadeloid Corp. (Dayton, O.).

•

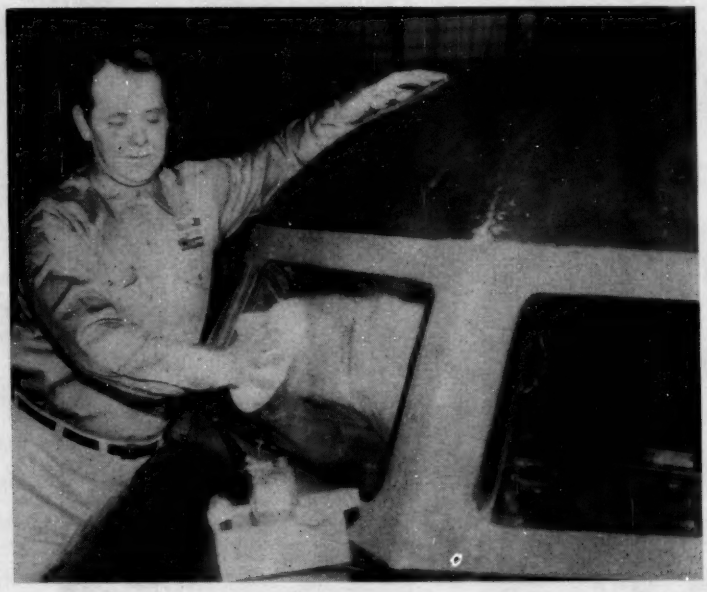
Nitrite for Resistance: Water-soluble nitrite has been incorporated into anti-corrosive paints by Wright Stephenson & Co. (New Zealand). The nitrites, in a neutralized resin base, are said to prevent oxidizing of metals (British Pat. 744,524).

•

Acidproof: A method of making gloves impervious to acids (even hydrofluoric) has been devised by Geoffrey K. White and Harold White (U.S. 2,713,548). Fabric-base gloves are dipped into a solution of polyvinyl chloride diluted with tritolyl phosphate at 55-65 F. Excess solution is allowed to run off, then the gloves are cured at 420 F.

•

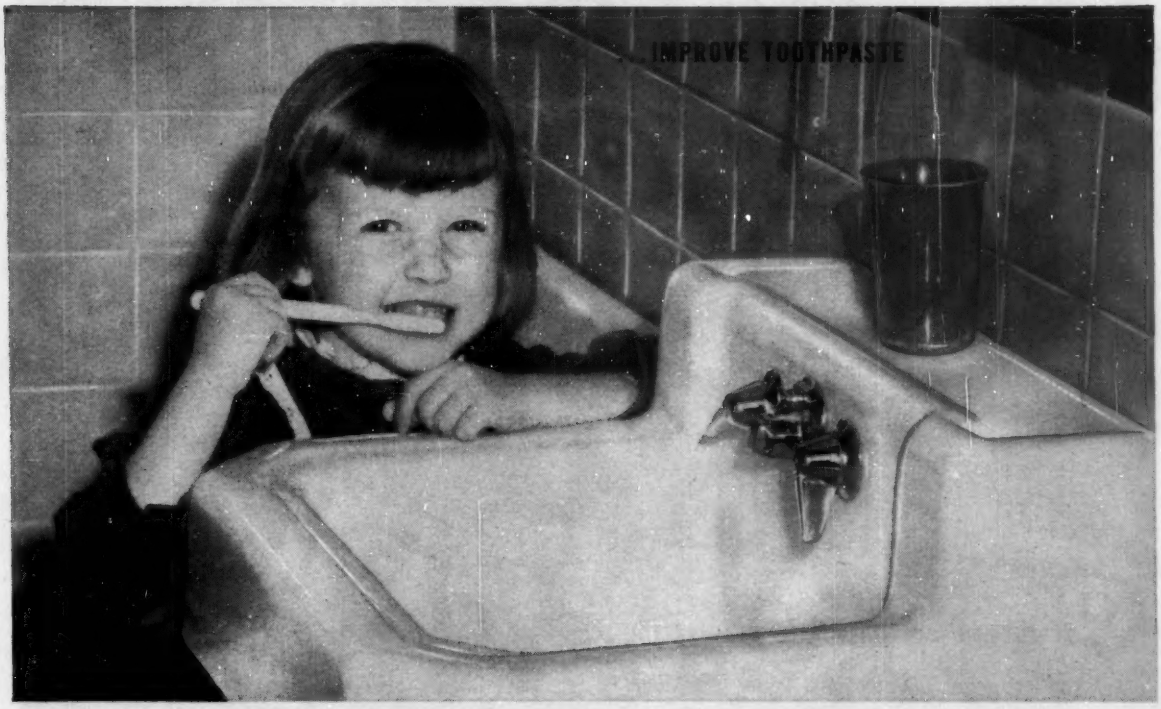
Nicotine Destaining: Nicotine—0.007 to 33% by weight—goes into a new cleaning compound developed by



Chemical Windshield Wiper

WINDSHIELD WIPERS on jet planes are expensive ($250-350), and can't always be made to work (the machinery necessary to fight the air load up to 800 mph. would be too heavy), so other ways to remove the vision-cutting drops have been sought. Douglas' DC-8 uses a hot-air blast; normal airflow will do it when rain repellents are used. F. D. Snell is making such a repellent for the Navy and United Air Lines (*shown using it above*). It can be applied easier and five times faster than early types. Basically, it is a refinement of the FC-10 brought out by Dow Corning of Canada in 1950: a silicone and wax combination. A temporary measure, these repellents are generally reapplied every few days.

HOW *HERCULES* HELPS...



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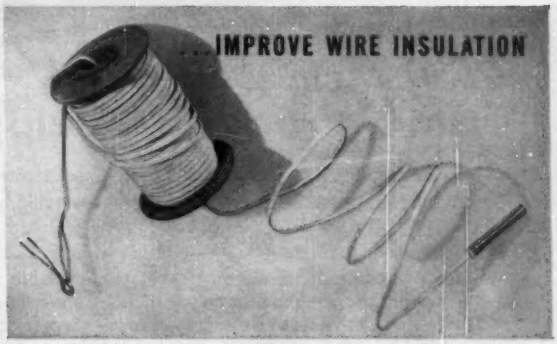

PLASTIC-COATED DUPLEX WIRE is used in this type of electric blasting cap assembly. The insulation has to be particularly tough since the wire assembly is used to lower charges of explosives into blast holes 100 feet or more in depth. The plastic coating on these wires is Hercules Hercocel® E, providing excellent insulating properties, good flexibility, and other physical characteristics to meet rugged field requirements.

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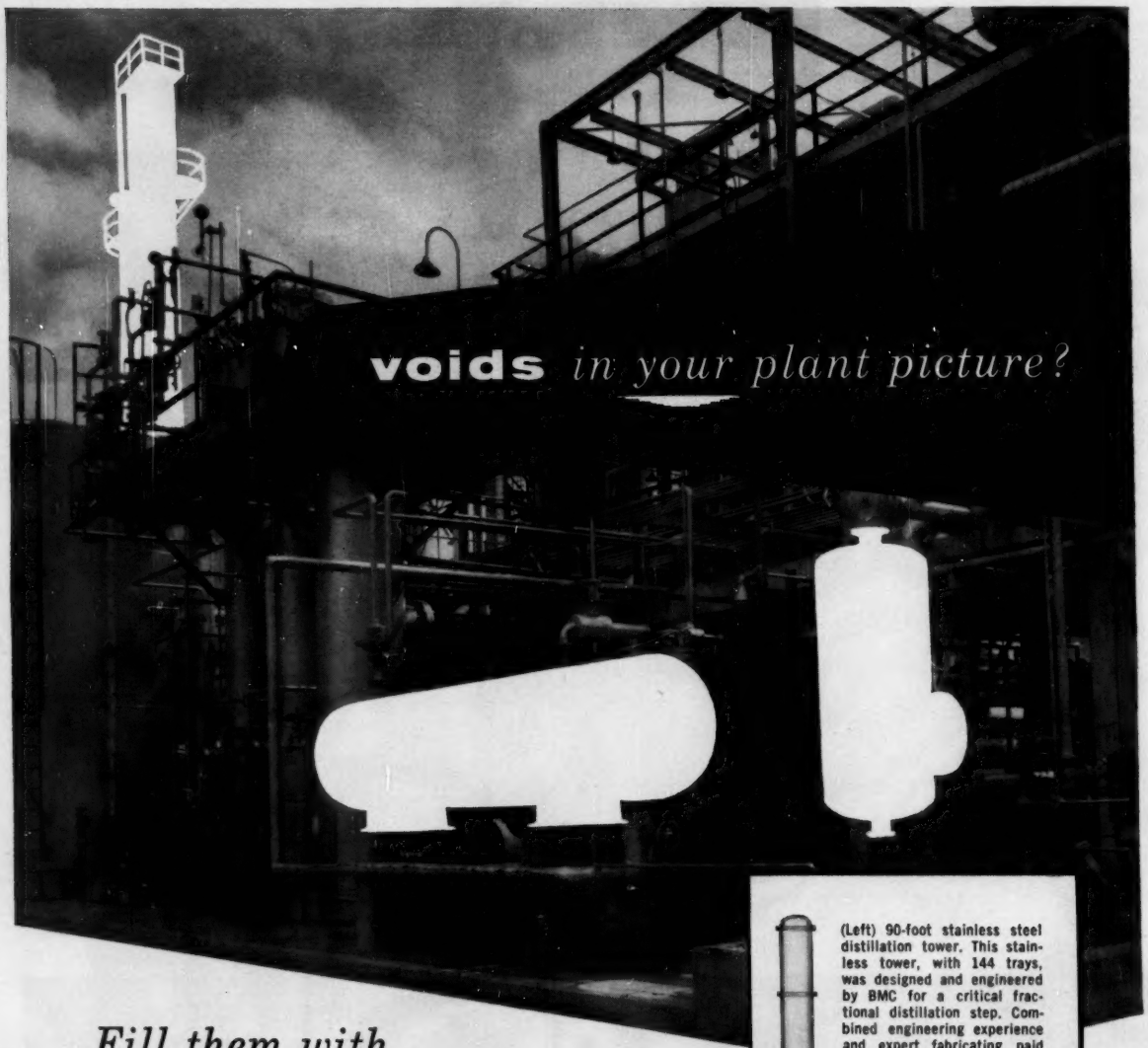

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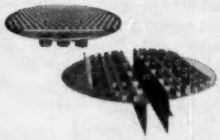

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SPECIALTIES . . . . .

Wesley Combs (Okmulgee, Okla.). The formulation is designed to soften foreign matter, so that it can be rubbed off (U.S. Pat. 2,739,130).

EXPANSION . . . .

Tape: The Kendall Co. is building a 35,000-sq.-ft. plant in Franklin, Ky., to produce Polyken industrial tapes, plastic films and plastic specialties. The two-story plant will triple the company's capacity for these products, which are now being made in Chicago.

•

Packaging: Cellulose casings for ready-to-serve meats and plastic packaging material for other food products will be made at a 200,000-sq.-ft., plant scheduled for completion in 1957 in Danville, Ill., by the Tee-Pak, Inc. (Chicago). The plant will employ 300 persons.

•

Spreading Ink: Sinclair & Valentine Co. has begun construction of a new printing ink plant in Albany, N.Y. Scheduled for completion by November, the plant will be S&V's 43rd.

•

Adding Area: United Lacquer Mfg. Corp. (Linden, N. J.) has just put into operation a new factory and warehouse near its plant. The new facilities boost manufacturing and warehouse area by about 80%. The firm says expansion was necessitated by demand for its multicolor paint.

PRODUCTS . . . .

Paper Work: Complete rotproofing of kraft paper without adverse effect on bursting strength has been achieved by dipping the paper in an 0.8% solution of phenyl mercuric acetate in water. This research, which, it is hoped, will lead to the incorporation of some preservatives in paper during manufacture, has been completed by the Division of Forest Products, Commonwealth Scientific & Industrial Research Organization, Melbourne, Australia. Other chemicals found to give protection: sodium pentachlorophenate (followed by copper sulfate) and mercuric naphthenate in mineral turpentine.

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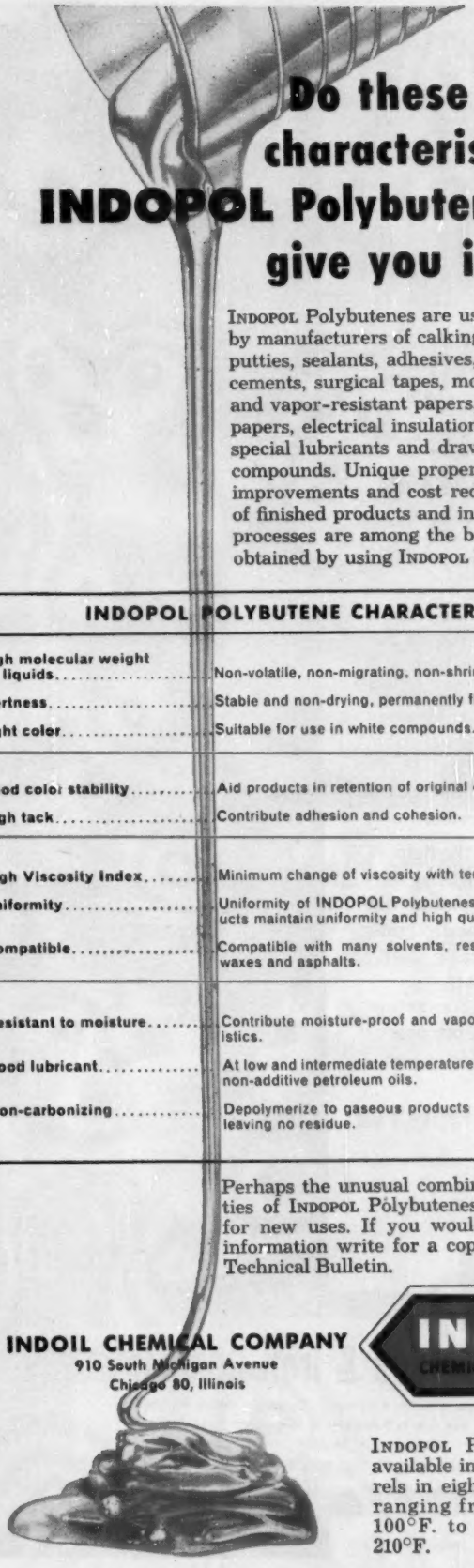
Under the Hood: A new silicone product to lubricate and preserve rubber shock mountings and door, hood and trunk weather-strippings



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Inertness	Stable and non-drying, permanently flexible.
Light color	Suitable for use in white compounds.
Good color stability	Aid products in retention of original color.
High tack	Contribute adhesion and cohesion.
High Viscosity Index	Minimum change of viscosity with temperature.
Uniformity	Uniformity of INDOPOL Polybutenes helps finished products maintain uniformity and high quality.
Compatible	Compatible with many solvents, resins, gums, rubbers, waxes and asphalts.
Resistant to moisture	Contribute moisture-proof and vapor-resistant characteristics.
Good lubricant	At low and intermediate temperature, similar to highgrade, non-additive petroleum oils.
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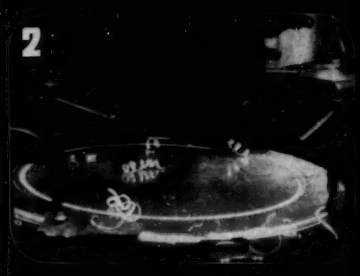
from Start to Finish...

CB&I BUILT ALUMINUM TANKS

Photo No. 1 shows the start of six aluminum tanks, 17 ft. in diam. by 17 ft. 9 in. high, built by Chicago Bridge & Iron Company for the Carbide and Carbon Chemical Corporation at Institute, West Virginia. Photo No. 4 shows the completed tanks, ready for service.

CB&I, a leader in the field of specialized welded plate structures, has four plants with *complete* facilities for designing, fabricating and erecting steel and other metal plate structures to the most exacting requirements. Write our nearest office for further information.

The tanks start here with aluminum plates in the plant receiving yard. Then they go to the layout shop for marking from templates and finally are trimmed to size.



In the shop the aluminum plates are rolled to the required shape and fittings and connections are machined to the proper dimensions.

This view inside the tank shows the lower ring of the shell being welded to the aluminum bottom.

This is the finish. Field erection has been completed, the tanks have been inspected and tested. They are now ready for service.

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SPECIALTIES . . . . .

is now being sold by Dow Corning Corp. (Midland, Mich.). Other uses for the 4X compound: keeps weatherstripping from freezing in place, makes ignition systems resistant to damp weather, is an antiseize for wheel lug nuts, reduces corrosion on battery terminals and cases. Two-ounce tube retails for $1.25.

•

Italy's First: The first Italian liquid fertilizer—containing urea, phosphorus and potash—has been prepared in Bolzano. It's being used in peach and pear orchards, and on market garden crops.

•

New Surface: Aluminum can be protected against corrosion, with improved paint base, or made more ornamental with a surface conversion coating now available from Turco Products, Inc. (Los Angeles). Unlike similar processes, the company says, new Turcoat 4178 becomes fixed and nonsmearing immediately upon application.

•

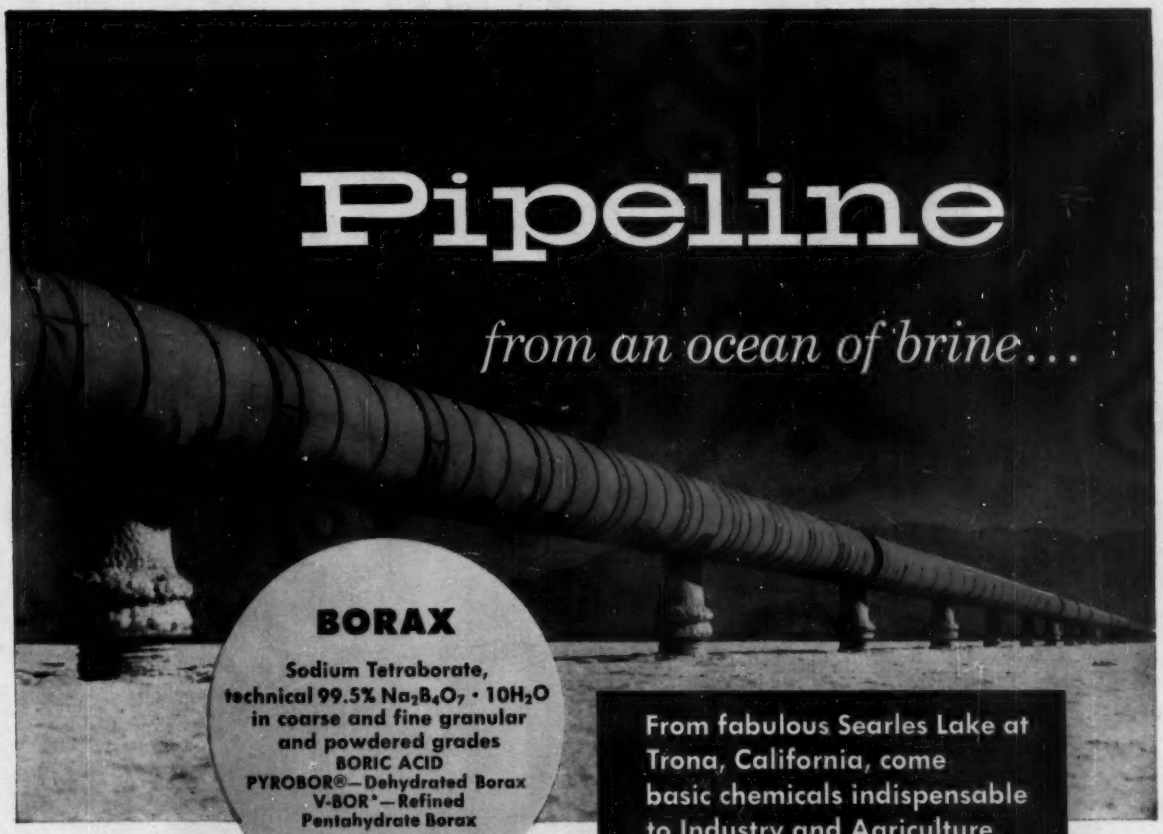
Unloaded Sandpaper: A sandpaper that doesn't load or clog when used on paints, lacquers, enamels and other soft materials will soon be marketed by the Abrasives Division of Armour & Co. (Alliance, O.). The new paper has a specially treated rubber base that keeps particles from sticking. It will be marketed in various grades for wood and metals and in sizes for hand- and machine-sanding.

LITERATURE. . . .

Silicone Finishes: Design and maintenance advantages for various types of silicone-base finish are described in a new Dow Corning brochure. Case history applications illustrate the usefulness of each type.

•

Fluid Law: The several groups trying to agree on a model brake fluid law for the Chemical Specialties Manufacturers' Assn. to recommend, have done their job. The proposed regulation, differing little from most of the five state laws now in effect, will be presented for adoption by the American Assn. of Motor Vehicle Administrators. Previously it was given to the Committee on the Uniform Motor Vehicle Code, which tentatively replied that issuing regulations was not within the scope of its activities.



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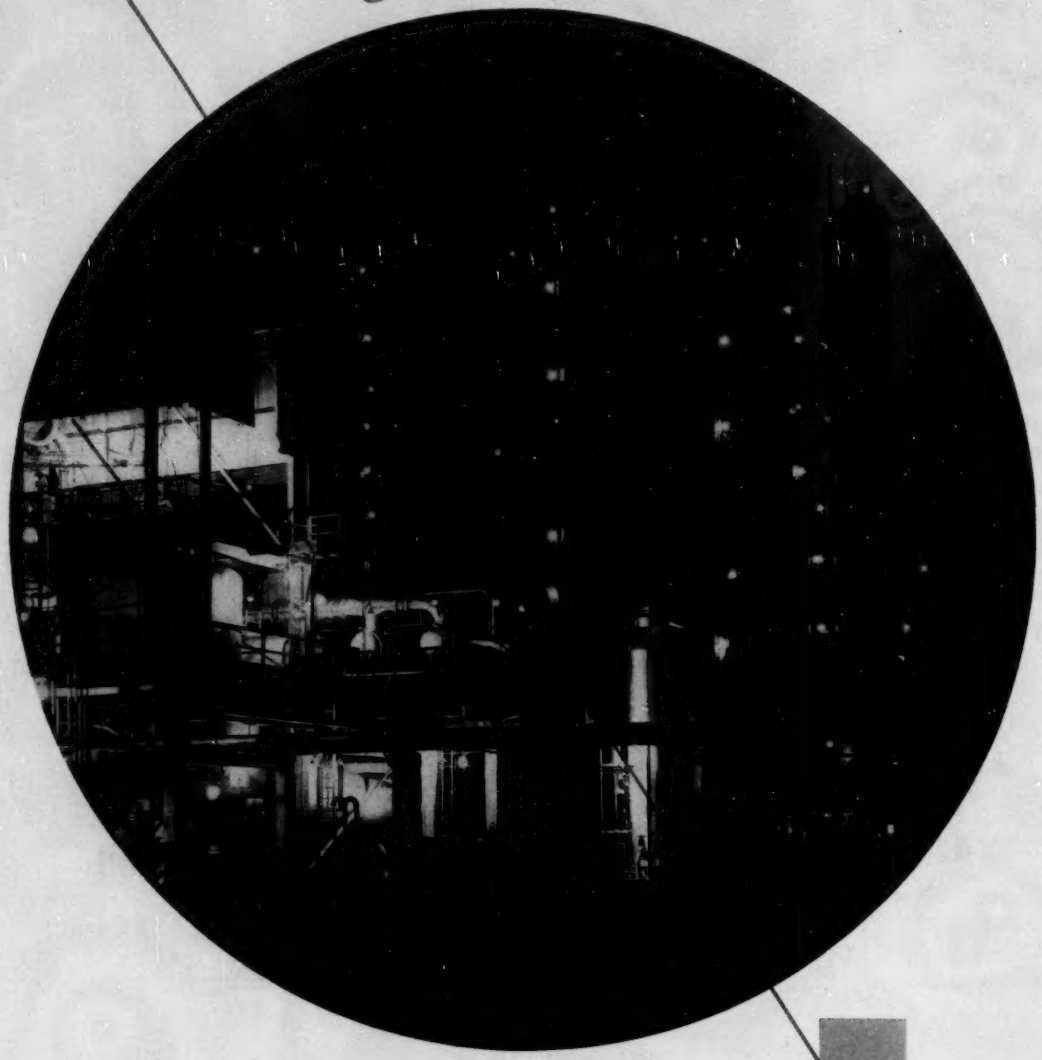

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Technology
Newsletter

CHEMICAL WEEK
April 21, 1956

You can expect to hear momentarily that American Cyanamid has sold its subsidiary, Chemical Construction Corp., to Electric Bond and Share. Neither firm is saying very much about it, but conferences late last week were going on, presumably to sign the final contracts.

Chemico will probably be operated as a sister organization to Ebasco Services. All of Chemico's personnel would likely be included in the deal, although some would be merely loaned, later returned to Cyanamid.

It's been clear for some time that Cyanamid is disenchanted with the idea of operating a construction subsidiary. For, although the rewards in such an enterprise can be big, there are some problems for a company like Cyanamid. For instance, there's always the question of how much know-how the parent's engineering department should contribute to a construction division that may build a plant for a competitor. (It should be remembered, however, that this has not proved any problem at all for other firms in similar positions.)

Electric Bond, through Ebasco, on the other hand, has been moving closer to engineering and construction activities through its economic evaluations. And it has worked with Chemico in the past on such projects as Escambia Bay.

•

A high-pressure area that's bound to develop into a storm center moved into Washington last week when independent laboratories had their say on means of keeping some firms from receiving the tax exemptions allowed for nonprofit research. They urged Treasury officials to disqualify labs that pay "excessive" salaries or those whose test results are used by business firms.

•

Now there's another method of hydroxylating allyl alcohol to make glycerine: Allied has patented a method employing allyl alcohol, hydrogen peroxide and formic acid (U.S. 2,739,173).

Shell Chemical has developed at least two ways to use hydrogen peroxide as a hydroxylating agent to make glycerine (*CW, March 24, p. 44*). One, which is the likely basis for its proposed synthetic glycerine operation at Norco, La., employs a sulfonic acid catalyst.

Allied has revealed no commercial plans for the process, which works like this: The formic acid goes to glycerol formate, which is converted into glycerine by reaction with methanol. By using a large excess of formic and by holding down the water content of the reaction mass, Allied was able to speed up the hydroxylation, get yields up to 94% (based on allyl alcohol).

•

Defense Mobilizer Flemming told the Joint Congressional Defense Production Committee last week that both Freeport Sulphur and Bethlehem Steel "are right at the point where they have found out how to process low-grade Cuban ore."

Both companies have for some time been working on leach processes that would extract nickel and cobalt from Cuban ore (*CW, Nov. 21, '53, p. 60*).

Freeport has been involved with a modification of the Chemical Construction acid leach. It had been concentrating on the leaching portion of the process at Freeport, Tex., while Chemico had been exploring the reduction phase at the latter's Linden, N.J., pilot facilities. But Freeport has built a full-blown integrated pilot plant at Braithwaite, La. (south of New Orleans, on the river).

Full reports are not in yet, but the pilot operation has been under way since shortly after the first of the year, and results are thought to be promising.

Not very much is known about Bethlehem's process. The company patented a sulfuric acid leach (U.S. 2,584,700), presumably has modified that to a nitric acid leach. Its process turns out a smeltable iron ore in addition to nickel and cobalt—which readily explains its interest in the project.

The method now used to exploit the Cuban ore is the Dutch-developed (and Freeport-modified) Caron process. Product is in the form of an oxide, rather than the primary metal.

•

Is sodium reduction going to get a tryout in zirconium manufacture? The answer would seem to be in the affirmative, if National Distillers gets a contract with the Atomic Energy Commission to make zirconium.

AEC is starting out on a 2-million-lbs., five-year procurement program for the metal. Though National Distillers isn't saying much about it at the moment, it is known to have submitted a bid. And it's thought to have an excellent chance of getting a major slice of the procurement pie.

The firm has done a lot of exploratory work on the use of sodium reduction in making titanium. Technologically, it wouldn't be very much of a step to translate that know-how to zirconium. Its work probably originated as a potential means of broadening the market for sodium. But the number of people it has had working on titanium, plus the fact that it is bidding to make the metal, amply indicates that the firm is a factor to be considered both in titanium and zirconium.

•

Rainmakers got together for three days recently at the University of Arizona at Tucson and decided that their profession was a science, after all. Some of the conclusions they reached about rainmaking:

- It works—silver iodide seeding in Australia increased rainfall 30% over normal.
- It's expensive—as much as a ton of silver iodide is needed for each cubic mile of cloud seeded.
- It requires more research—some uniform-size solution might eliminate partial failures. Also, some substitute must be found for silver iodide, which decays in sunlight and loses its effectiveness. (Copper sulfide vapor might be the answer.)

The one sour note in the entire symposium was sounded by statistician K. A. Brownlee, of the University of Chicago. Commenting on figures showing increased rainfall in Western states brought on by rainmakers, he said: "We are of the opinion the claims are greatly in error and . . . are based on incorrect methods. We, as professional statisticians, regard them as quite ludicrous."

•

And in Atlantic City this week, at the American Assn. for Cancer Research meeting, Ernest L. Wynder, head of Sloan-Kettering Institute's epidemology section, reported that the fraction of cigarette tar that causes skin cancer in animals has been isolated. He said the fraction represents less than 2% of the total tar and appears to contain most of the tar's cancer-causing substances.

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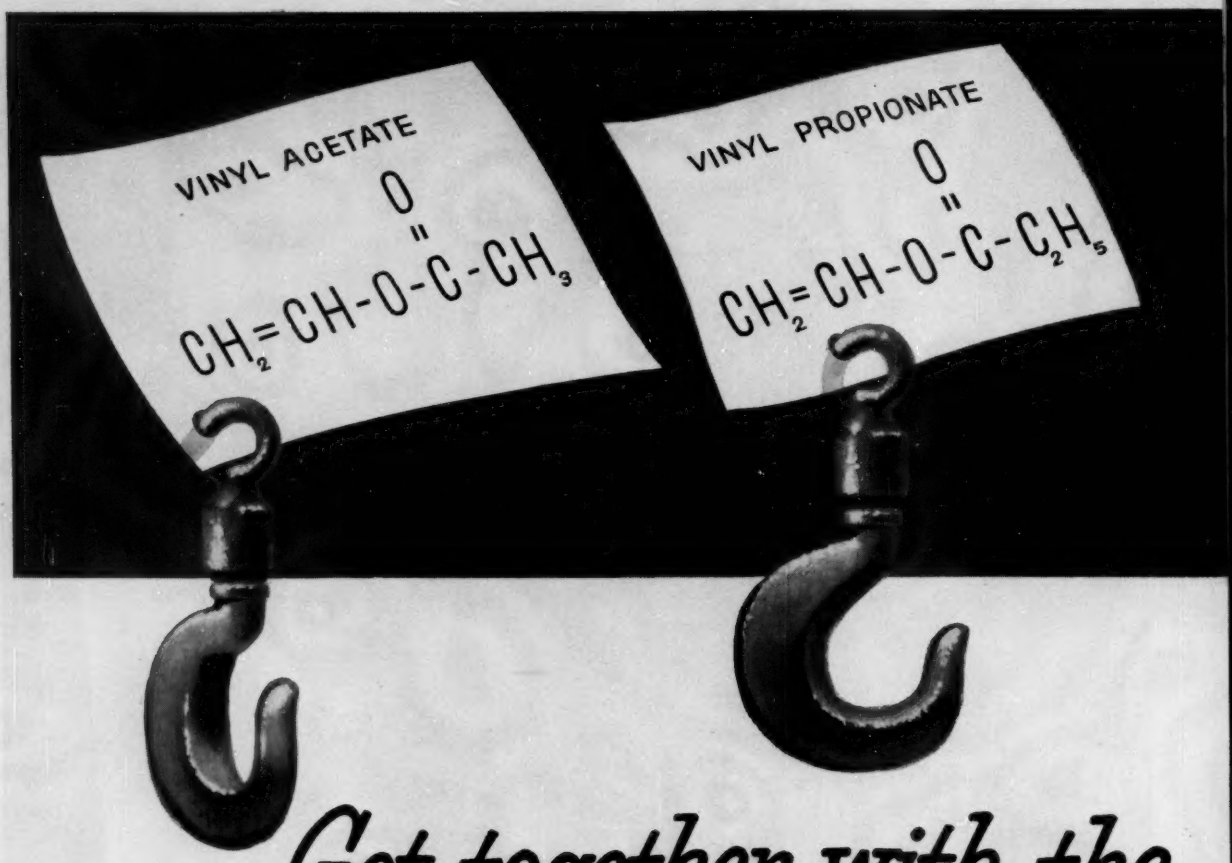

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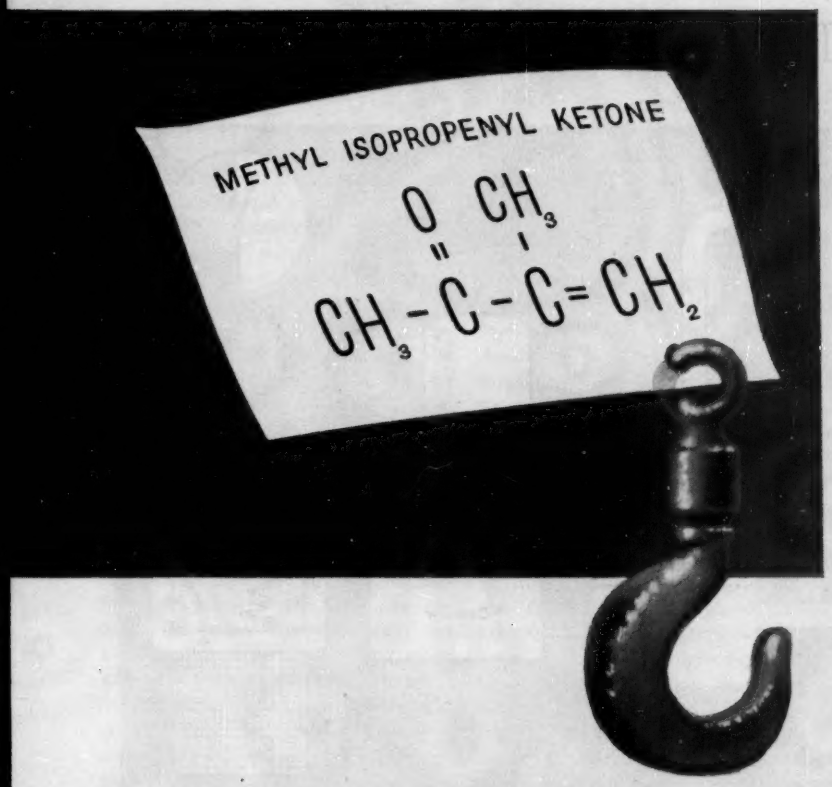
Specific Gravity @ 20°/20°C	0.9330-0.9340	0.9160-0.9185	0.854
Acidity as acetic acid, % wt., max.	0.02	0.1	



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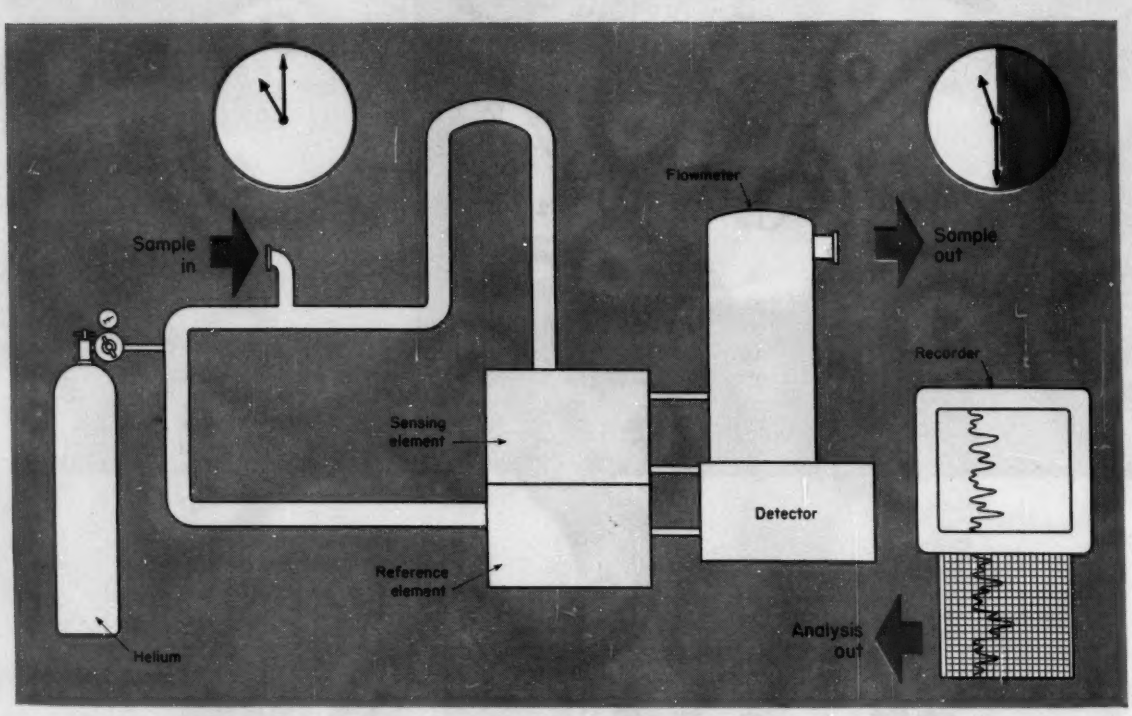

GAS CHROMATOGRAPH: For in-plant process—and quality-control . . .

Now: Half-Hour Gas-Stream Analysis

In a field where standout performance is commonplace, gas chromatographs have been setting a fast pace. Already important as analytical tools in research (CW Jan. 21, p. 91), they're now seeking gainful employment on the production line. And if the interest generated by the chromatography symposium at last week's American Chemical Society meeting in Dallas is any indication, it shouldn't take instrument engineers long to capitalize on the unique abilities of these speedy chemical separators.

Though chromatographs might win a production berth on their speed alone (typical analyses require only 15-30 minutes), that's not the only advantage they bring to process control. They can also distinguish between components that defy separation by conventional distillation techniques. This is particularly helpful to petroleum and petrochemical processors whose products and raw materials often contain hard-to-separate hydrocarbon isomers.

Too, analysis of individual chemical components avoids troublesome interference such as that caused by overlapping absorption spectrums in infrared control systems. And the apparatus can be made highly specific for a given group of components (e.g., a total C_4 fraction) simply by selecting the proper column packing.

Still another characteristic that appeals to instrument engineers is the chromatograph's simplicity. Unlike many other types of analytical instruments too delicate to be used under less-than-ideal conditions, the chromatograph is rugged enough for average plant installations. And because it's almost completely automatic, it does not require a highly skilled operator.

Modification Needed: Of course, the chromatographs commercially available today for laboratory use aren't tailored to specific process control jobs. But all that's needed to adapt the basic instrument to stream analysis and control applications is the addition of electrical circuitry to take over the manual operations.

For one thing, chromatographic analysis is batch, rather than continuous, therefore would require an automatic system for sampling the process stream at predetermined intervals. Instrument manufacturers are already bringing out precise-volume valves* to replace the measuring syringe conventionally used for manual introduction of chromatographic samples. And with a little gadgeteering, instrument engineers should have no trouble adapting such devices to repetitive sampling operation.

Slightly harder to handle, especially in a closed-loop control system, is the chromatograph's electrical output. Existing equipment converts this output into a chromatogram (a series of peaks representing the concentration of the various components), or, by automatic integration, into a record of

*e.g., Perkin-Elmer recently developed a manually operated precision valve for taking reproducible volumes of gas from a continuous stream.

mol-percent concentrations present.

As a guide for process operators, the complete analysis of a process stream may be very helpful, or even necessary. But for an automatic feed-back control system, it would probably be necessary to select the electrical output from only one or two of the components. One way to pick out the proper signal is to time the passage of the sample through the column. At a given flow rate, components emerge from the column at a fixed time after the sample is introduced. Beyond that, it's up to instrument engineers to select and utilize the proper output signal.

Applications Guarded: Just as the simplicity of chromatographs makes it difficult for the instrument manufacturers to keep secrets from one another, so does the complexity of individual process applications make users reluctant to disclose their hard-won know-how. And though none will go into the details, several chemical companies are known to have chromatographic control systems in pilot operation or just about ready to go onstream.

Du Pont, for example, has spent considerable time investigating process applications of both commercial instruments and instruments of their own design, has found them suitable for quality control analysis of feed, intermediate, and product streams. The company's instrument research department has also tackled the development of auxiliary electrical circuitry, admits that it's close to a workable automatic system.

Gulf Oil is using the Fischer-Gulf Partitioner (co-developed by Gulf Research and Fischer Scientific) as a control tool to monitor the operation of several distillation columns at regular intervals of 30-60 minutes. And Alcoa is reportedly using chromatography in Texas to assay the value of salable by-products in the exhaust from its natural gas-burning turbine engines.

Apart from its promising role in process instrumentation, gas chromatography may have an even brighter future in the large-volume production of high-purity chemicals from complex mixtures. It has already been used for separating laboratory quantities of material; for example, it can turn out pentane that's purer and cheaper than samples produced (at about $10/gram) by the best distillation methods.

But don't look for large-scale chromatographic equipment in the near future. For it will require much more engineering than a simple physical scale-up. Increasing the size of the column boosts not only the throughput capacity, but also the batch cycle time. And while these problems may not be insurmountable, they will likely delay the development of production-size chromatographs, at least until engineers learn more about the mechanics of the elution-partition principle.

More to Come: Chromatographic equipment is rapidly becoming more plentiful, more versatile, as keen competition among manufacturers spurs the development of special-purpose components and accessories. And soon, the chromatographs now on the market (Burrel Corp.'s Fracton and Kromo-Tog; Fischer-Gulf's Partitioner; Hallikainen-Shell's Chromagraph; Perkin-Elmer's Vapor Fractometer; Podbielniak's Chromacon; Research Equipment Corp.'s Distillograph) will be joined by two more:

- Beckman Instruments, Inc. (Pasadena, Calif.) will be out with a small gas chromatograph for gas and low-boiling liquids analyses, probably in June. A special-purpose unit, it won't provide for high-temperature column operation, will sell for about half the price of currently available instruments ($1,300-3,000, depending on accessories included in the basic unit). Standard strip-chart recorder, integrator, and a sampling device will be available separately.

Intended primarily for laboratory use, Beckman's chromatograph is not designed to handle continuous stream analysis on a production basis. However, says the company, continuous analysis would be feasible in pilot-plant work.

- Consolidated Electrodynamics (Pasadena) will enter the field in a few months with equipment that, it says, will be competitive in performance and cost. Further details are lacking, but Consolidated hints at "some new contributions to the art."

With the confident acceptance of both manufacturers and users to bolster its move, gas chromatography seems certain to win a place on the process industry's production team.

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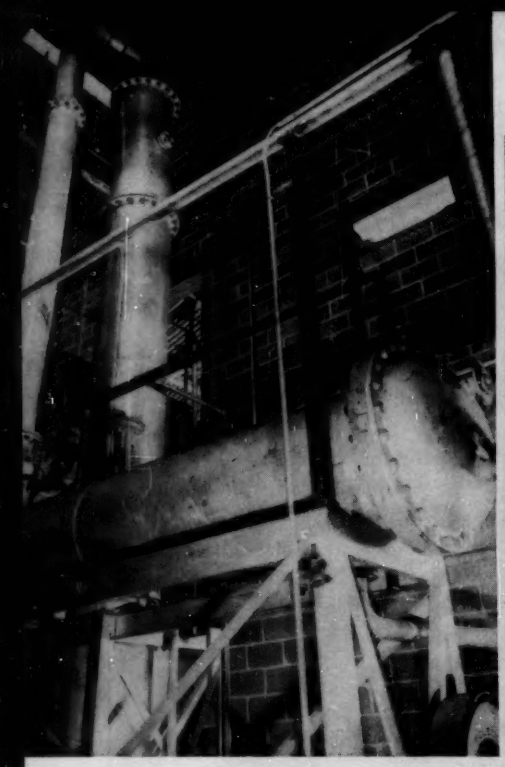

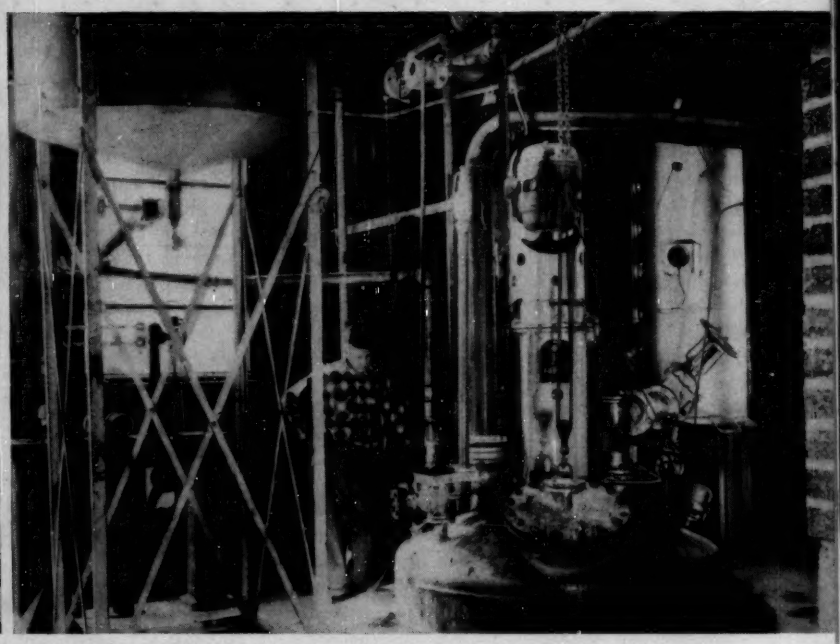

NEW STILL (left) turns out high-quality material for specialty resin production (right) as Pine Chemicals boosts a . . .

Resurgence in Rosin

With the startup of its new plant at Fieldsboro, N. J., Pine Chemicals, Inc., proved that the naval stores industry is never too old to learn a new trick. Now, for the first time since processors started batch-processing pine products for wooden ships, pine oleoresins can be distilled and refined continuously.

Though continuous distillation has long been used for refining wood rosin (recovered by the destructive distillation or extraction of pine stumps), it took years of development to come up with a satisfactory process for treating the sap from living trees. In designing the Fieldsboro plant, Pine Chemicals drew on both the commercial processing experience of its affiliate, Filtered Rosin Products, Inc. (Baxley, Ga.) and the pilot-scale know-how pioneered by USDA's Olustee, Fla., Naval Stores Station.

The basic raw material—crude gum from living pines—is barged to Fieldsboro after it has undergone initial filtering and washing operations at collection sites in Florida and Georgia. From the barges, it's pumped into a huge storage tank to await final processing.

Flash Distillation: Refining at Fieldsboro begins with chemical treatment and pressure filtration of the crude gum. In these steps, dissolved and suspended impurities that would impair the rosin's quality and color are removed. The clean gum is then preheated to about 350 F and pumped into a 30-ft. continuous steam distillation column.

Within the still, the turpentine component of the gum is flash-vaporized and passed into a condenser. The liquid turpentine is then pumped through a "low wine" separator, which removes caproic, valeric, butyric and isobutyric acids. After a final dehydration, the product is packaged as high-grade, low-acid turpentine.

High-quality hot rosin is continuously withdrawn from the bottom of the still and sent either to packaging or on to further processing. A large portion of the rosin takes the latter route to a series of oil-fired autoclaves in which it's reacted with secondary chemicals for conversion into several types of specialty resins and resinates.

Better than Batch: Probably the greatest advantage of continuous distillation over the batch-still operation, says Pine Chemicals, is the short time necessary for the gum to pass through the high temperature zone. In batch operation, where the gum is held under high heat for about one hour, the levopimaric acid in the gum isomerizes to form abietic and intermediate acids. By reducing the heating period to only 5 minutes, continuous distillation produces rosin that's more nearly in its natural state and, therefore, more reactive.

Commercial Comeback? Once the only source of naval stores, exudate from living trees now supplies about half as much rosin as do stump-wood sources. But with chemical markets pushing rosin production to a 16-year high, the new refining technique may help spark a rejuvenation of the pine sap industry.

EQUIPMENT . . . .

Liquid Metal Pump: Westinghouse's Atomic Equipment Dept. has come up with a "canned-rotor" centrifugal pump for moving hot (up to 1600 F) liquid metals. Suggested for nuclear power plants, chemical process lines and similar high-temperature systems, the new pump is rated at 150 gpm. at a 285-ft. head.

•

Pipe Jacket: Glass-cloth, impregnated with epoxy resin, makes a good protective—and reinforcing—coating

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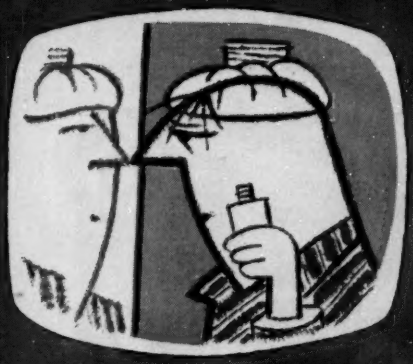
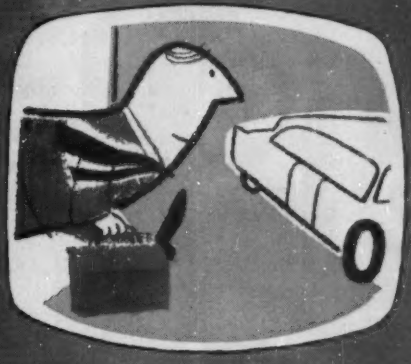


MORNING SCENE:...You, contemplating yourself in bathroom mirror. Headachey? Cold coming on? You reach for tablets made with Pfizer Acetophenetidin (for pain relief) and Pfizer Caffeine, always of highest purity... Next...

BREAKFAST SCENE: Biscuits? Vitamin-enriched with Pfizer Bi-Cap. Jelly? Pfizer Citric Acid brings out true fruit flavor. Frozen peaches on cereal? Better color and flavor, thanks to Pfizer Ascorbic Acid. Even the...oops! We're lagging...



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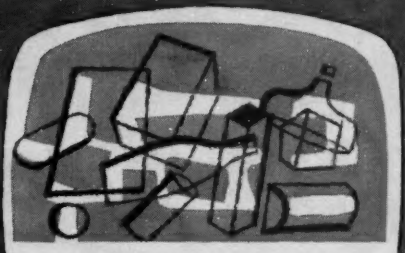

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for acid-carrying pipe. The cloth is supplied as a tape (3 in. wide), is spiral-wound onto the epoxy-painted pipe, then coated with more epoxy (supplied by Bakelite). Asphalt can be put over the epoxy for insulation, and the asphalt coated again with tape and resin. The epoxy resin must be oven-cured (90 C for about five hours).

•

Triple Duty: New air control assembly made by Airmatic Valve, Inc. (Cleveland) filters, regulates and lubricates compressed air used for pneumatic equipment. Automatic drain trap, attached to the filter, collects and drains moisture.

•

For Furniture Movers: An expandable bench system designed by Products For Industry (Stamford, Conn.) is now on the market. Members—work panels, legs, support frames, etc.—are completely interchangeable, may be lined up back-to-back, at right angles, or in various combinations simply by unlocking a few bolts. This Product-A-Flow system is offered in basic 6-ft. lengths.

•

Light Light: New portable source for ultraviolet light is now available from Black Light Corp. of America (San Gabriel, Calif.). Retailing for $22.50, Blak-Ray, as it's tagged, has a special filter that provides peak emission at 3,660 angstrom units.

•

Steam Cleaner: Turbo Machine Co. (Lansdale, Pa.) is now selling an electrically heated device for steam cleaning. Water passes through an electrically heated copper coil, is converted into 50% saturated steam, and mixed with detergent for cleaning. A 30-kw. power supply is required; unit is available in 220, 440 and 550 voltages, 2 or 3 phase.

•

Hot Gage: Electrically heated gages and valves are now offered by Jerguson Gage & Valve Co. (Somerville, Mass.) for use with such materials as waxes, thick oils. The units are available in double-chamber reflex or external-tube transparent-gage models, in various sizes and pressure groups. Explosionproof equipment is available.

•

Regulated Purity: Puromatic Controller is the new feature of Barnstead Still & Sterilizer Co.'s (Boston, Mass.) water stills. Purity of the water desired can be set upon the device's controller —water below the preset purity is diverted as waste. The unit works on the conductivity principle: the more impurities in the water, the better it conducts electricity.

• Penfield Manufacturing Co., Inc. (Meriden, Conn.) is also supplying a self-regulating pure-water source. The Penfield unit is a monobed demineralizer, with a 500-gph output. Regeneration is done automatically.

•

Compact Centrifugals: Bart Manufacturing Corp. (Belleville, N.J.) has just introduced a line of Flex-Seal centrifugal pumps that are claimed to provide almost twice the capacity and head pressure of other pumps of equal size and horsepower. Features: close-coupled junction between pump and motor to permit easy seal replacement; new "preset," two-piece seal that requires no adjustment after installation.

•

Sure Grip: Surety Rubber Co. (Carrollton, O.) now offers rough-finish coated fabric work gloves designed to provide a positive grip, withstand oils, acids and solvents. Dubbed Griptite, they're available in several styles with chemical-resistant, vinyl-base coating.

•

Stand-By Gas Plant: Submerged Combustion Co. of America, Inc. (Hammond, Ind.) recently developed a package plant to supply propane gas for industrial operations when city or natural gas supply is cut off. The stand-by unit mounts vaporizor, tank, and controls on heavy metal skids for easy portability.

Pattern for Expansion

TO HASTEN THE ARRIVAL of nuclear power, Sylvania Electric Products, Inc., has just launched a multimillion dollar program to expand its fuel element production facilities. Scheduled for completion in late 1957, the beefed-up version of Sylvania's present plant (*above*) will eventually offer complete "out-of-pile" service for separating and recovering spent nuclear fuels. Growing out of a 10-year interest in the development and production of fuels, reactor components and materials, the 5-year expansion program reportedly will be completely financed with company funds.

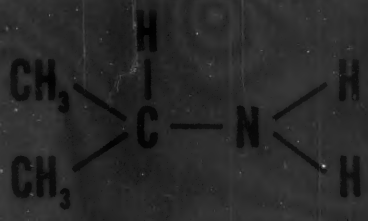
The plant will be located on one of several sites in the East.

If you are using ALKYL AMINES

YOU CAN SAVE ON:

- Raw Material Cost
- Storage Facilities
- Handling

by using



SHARPLES ISOPROPYLAMINE

Raw Material Cost

1. By far the **lowest priced alkyl amine on the market**—molecular weight 59.1.
2. Isopropylamine can often replace both secondary and primary amines.

Storage Facilities and Handling

1. The lowest molecular weight amine available in anhydrous form which does not require special containers.
2. Less storage space used—no water to store.

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Gentlemen: Please send me full technical information on Isopropylamine.

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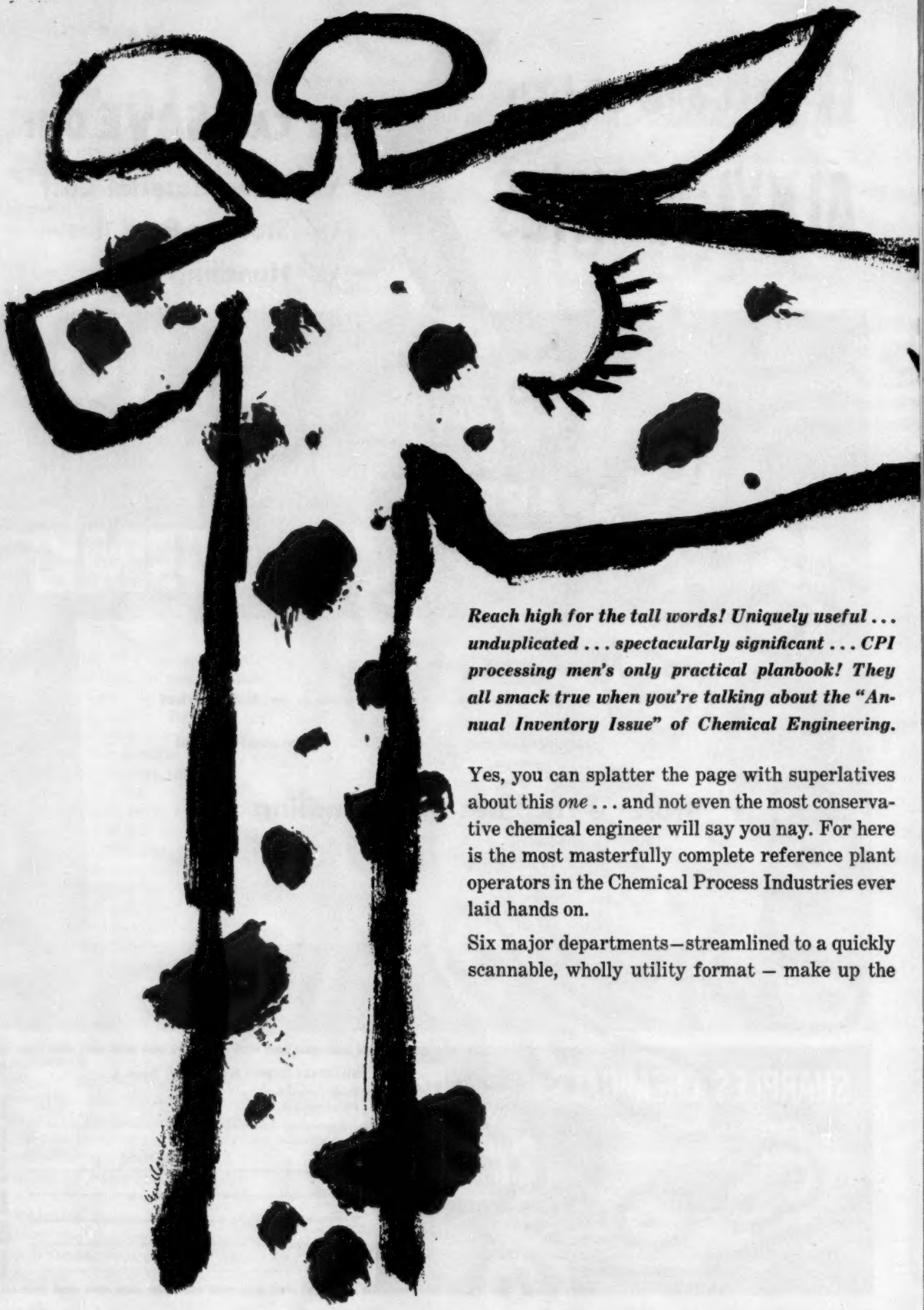


Reach high for the tall words! Uniquely useful . . . unduplicated . . . spectacularly significant . . . CPI processing men's only practical planbook! They all smack true when you're talking about the "Annual Inventory Issue" of Chemical Engineering.

Yes, you can splatter the page with superlatives about this *one* . . . and not even the most conservative chemical engineer will say you nay. For here is the most masterfully complete reference plant operators in the Chemical Process Industries ever laid hands on.

Six major departments—streamlined to a quickly scannable, wholly utility format – make up the

What makes this one stand alone?

heart of the '56 edition. *Plants & Facilities – Processes & Technology – Chemicals & Materials – Equipment & Accessories – New Technical Literature* . . . plus an alphabetical *Company Index* of all advertisers and sellers in the editorial pages . . . and a *Reader Service* that's most helpful, used more often than that of any other single issue of a CPI publication. And like always . . . the fact-matter has been boiled down to a concise, useable core to make it more convenient for you to work with.

Advertisers share the benefits with readers in this INVENTORY ISSUE. Come September's publishing date, production buyers are ripe for suggestions on better equipment, materials and services... they get 'em in both ads and editorial in this *one* . . . it hits readers' desks at the kick-off of the hottest buying and selling season, gets dog-eared use till the next issue's out. It has to! For it's the only complete compendium of CPI progress in the market . . . a 12-months summary of *what's new* that no CPI planner can do without. Neither can you . . . if you're selling engineering-minded production men in the Chemical Process Industries.

Published SEPTEMBER 15th

Closing for advertisers AUGUST 1st

Chemical Engineering's 1956 Annual Inventory Issue

A McGRAW-HILL PUBLICATION, 330 WEST 42nd ST., NEW YORK 36

DOW'S KOCH: Distributor programs help dealer and supplier spur LCL sales.

'It's Worth Going After'

"Yes—there's good reason why some of the chemical manufacturers are helping their distributors more. The less-than-carload-lot market is worth going after—and the distributor is the logical choice for the job."

This is the way that veteran Dow sales executive Fred Koch sums up the renewed interest by a part of the chemical industry in the welfare of the chemical distributor. (Only a few weeks ago, for example, Wyandotte Chemicals took two-page ads in business publications to pose the question, "The chemical industry is growing—but how about chemical distributors?")

If the policies of several companies are any indication, it seems clear that they want the distributor to grow with the industry. Celanese, Dow, Hooker, Olin Mathieson, Niagara Alkali, and Wyandotte—to cite a few—are among those actively pushing programs to help the distributor get more sales.

Some plans are now a matter of formal policy directed by a sales executive specially assigned to the task; other plans, also effective, operate on an informal basis. Generally, the programs embody two basic principles:

- Supply the distributor with all the technical, market, business, and product application data that he can use in his sales efforts.
- Protect the distributor's interest in the trade.

How to Do It: Methods of accomplishing such goals vary considerably, of course:

- Information for the distributor is at the heart of the Dow program. Each Dow dealer (including 400 large ones) receives bulletins on new products, a copy of the company magazine (to foster "family" feeling), leads for new prospects, data on new applications for existing products. Additionally, a manual on "what industries buy what company products" is supplied as well as promotional material, such as product samples, advertising mats and literature. Dow does not, however, share advertising costs on distributor promotion. Salesmen are the prime means of personal contact with the dealer, and the Midland firm likes to offer a salesman's assistance at distributor sales meetings. On occasion, special conferences for distributors have been held. And, adds Koch, the company is always willing to furnish advice on distributor problems when asked.

Dow's program is headed up by Koch, special assistant to the general sales manager, and is supervised on the local level by area sales managers.

- Selling LCL quantities through a chain of some 50 distributors (120 if branches are counted), Celanese runs its distributor relations on an informal basis. Base of the company's approach is to make the distributor feel a part of Celanese's sales arm, not merely another account on the salesman's list.

This is accomplished by not attempting to solicit LCL business, letting the dealer handle (material that's bought while a customer is developing a process), suggesting that tank-car purchasers satisfy LCL needs through the distributor, and referring LCL inquiries to the dealer. In cases where the distributor develops an account from LCL to tank-car volume, company policy is to let the distributor retain the account.

On the other hand, distributors are required to notify Celanese of bulk-volume requests, and the company grants no exclusive territories. Although territories are nonexclusive, Celanese does define the area, avoids locating distributors to compete with each other.

Although Celanese supplies literature, samples, technical service, and in some cases ventures into cooperative advertising, it does not issue lists of industries that could use the company products. This, however, may come. Like other firms, Celanese will assign a salesman to a distributor meeting when requested. And the firm is usually willing to supply engineering aid on problems of corrosion, storage, materials handling.

- In terms of geographical area and product line, Mathieson's system is informal, but with respect to the pattern of selection, supervision and support, the program is firmly spelled out. Within recent years, Mathieson has switched from direct-to-distributor sales to reach much of the LCL market.

Seeking for the distributor larger sales and an increased share of the local market, Mathieson provides both

primary and secondary selling aids. Essential tools are an established product, dependable supply, and technical service. The second line of help includes distributor sales meetings, direct mail literature to the consuming trade, distributor literature kits, and charts, movies and other types of sales aids. In a recent case, the company aided in obtaining a business site and employees for a new distributor organization.

Over-all direction of the program is centered in Baltimore, but district managers handle local coordination, make recommendations for addition or deletion of dealers. By selecting a few, "strong" distributors rather than many, and by providing full support, Mathieson claims it "enhances the possibility of a strong and stable merchandising program."

• At Wyandotte, distributor development and policy have been formalized for many years. Effected through a distributor department, Wyandotte's policy aims to foster coordination and understanding. The statement clearly defines what the distributor and the company's responsibilities and services to each other are.

Keeping the distributor fully informed is one of the important aspects of Wyandotte's system. To achieve this end, the company has staged contests that asked distributors to rate product literature (*CW, April 10, '54*). The method provided Wyandotte with insight of the literature's effectiveness, uncovered new ways of using promotional material, and familiarized jobbers with the full array of sales aids available.

Latest wrinkle in the company's dealer relationships is a series of advertisements. The purpose: to beef up the prestige of the distributor by focusing attention on the vital services he has been performing for the chemical industry.

Growing concern with the distributor's welfare by the large supplier has somewhat more meaning than that of a simple effort to build sales. In recent years, the role of distributors in chemical sales has been questioned, and the dealer has come under sharp attack as the weak link in the sales chain.

The distributor development programs are a vote of confidence in the distributor's future.

Pitfalls in Publicity

Chemical sales and advertising executives are this week pondering the personal meaning of the embarrassing situation Wyeth Laboratories has become enmeshed in.

Wyeth has been taken to task by *Editor & Publisher* columnist Robert Brown for its handling of publicity and the announcement of a new ataractic drug, Sarine.

Wyeth announced the new drug in a letter to doctors several days in advance of the release to the press and prior to publication of a technical article in a medical journal. Brown claims that the letter told the doctors that "it is almost impossible to control publicity on . . . new scientific achievement; . . . a few articles have appeared, and because we want you to know about the drug from us and not the newspaper, . . . this letter is being written. Prerelease publicity is unfortunate . . ."

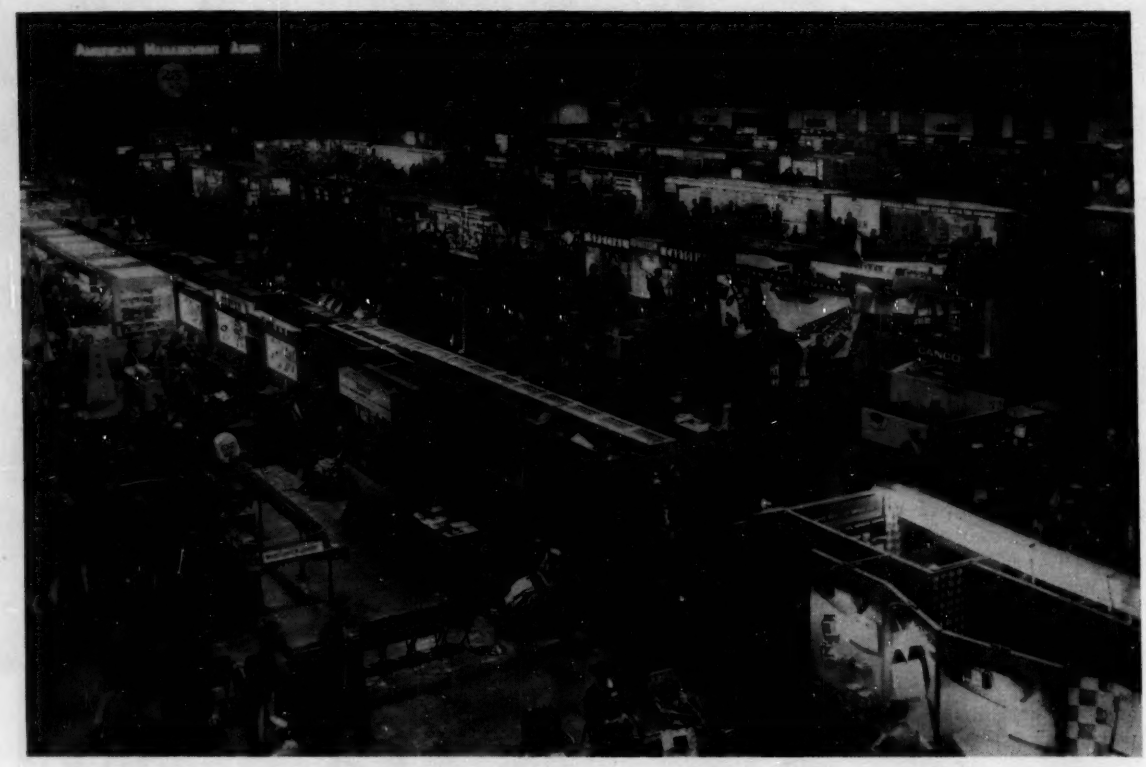
Brown asserts that the letter criticizing the press was prepared while the "company was planting the story with newspapers." And he adds, "It sounds like a weasling way to observe . . . medical ethics . . . "

Wyeth is now striving to clear up the misunderstanding. Says its public relations agency, Lewis & Gilman: "Wyeth had received . . . critical mail from physicians because the company had not first informed them of . . . a new product. Several months ago, a new policy was adopted—inform the doctor first, then the public.

"Reference to prereleased publicity was a mistake. . . . the letter was unfortunate . . . the company is sorry."

Leveling Out the Level

ECONOMIES of water shipment are too enticing to be ignored because of unusual requirements in dock facilities. One example: American Synthetic Rubber Co.'s new mooring towers on the banks of the Ohio at Louisville, Ky. Because of extreme variations in the river level, the company has installed these 72-ft.-high, 18-ft.-diameter steel sheet pile cells. The cells have three platforms at different elevations to give safe working areas for unloading. A 222-ft.-long walkway carries pipelines to the shore. The installation allows American Synthetic to make full use of water freight's cost-saving potential.



NATIONAL PACKAGING EXPOSITION: Ideas by the bottle, box and bagful.

Packaging Show: Idea Supermarket

Some 30,000 visitors went to the huge American Management Assn. National Packaging Exposition in Atlantic City last week to see what's new in packaging. Most came away eye-weary and foot-sore—but convinced that it was worth it.

Here are some of the highlights of thousands of items displayed by more than 400 exhibitors:

Polyethylene Containers

Plax Corp. displayed a one-trip disposable polyethylene bottle for battery electrolyte. Actually the container more closely resembles a bag than a bottle. It's constructed of a thin wall (6 mil) of polyethylene, is blown in one piece (no seams), and is now available in a 45-oz. size. Coming soon is a unit for 55-oz. acid handling. Approved by the Interstate Commerce Commission, the unit is shipped with fiberboard jackets, in corrugated cases. Present users: Gulf Oil Co. and Globe Union Battery.

Another novel use of paperboard and polyethylene is the cube-type container developed by Bakelite to hold foods, chemicals, acids and alkalis. Designed for one-way shipment, the unit—called a Cubitainer—consists of a semirigid, cube-shape insert formed of polyethylene and an outer carton of corrugated paperboard.

The polyethylene bag is first filled with liquid, and a heat-sealed flap is tucked under the flap of the outer container. To use, the end is snipped off the polyethylene flap, which then serves as a spout. The outer container has die-cut holes, which serve as a grip when pouring the liquid. The unit is available in 1-qt. and 1-gal. sizes, will soon appear in a 5-gal. size.

Also shown were polyethylene containers—already in use in the Midwest—that replace 5-gal. steel cans for cream shipment. Durethane Corp. (Chicago) is one supplier.

A number of polyethylene units for larger quantities of liquid were displayed. Plax showed a 16-gal. carboy that it is beginning to manufacture in the U.S.

Two handles at the top of the unit and a sprout located close to the rim make for easier in-plant handling and pouring.

Aerosols

Mojonnier Associates' new low-price filling unit (*see p. 50*), was the big news here.

One fairly recent new use for aerosols is a unit developed by American Can as a soft-drink concentrate dispenser. Now being market-tested in Jacksonville and Miami, the pressurized product is moving well. Called Real Kool, the soft-drink concentrate comes in 7 flavors. Tablespoonful of concentrate is squirted into a glass, ice is added, and tap or carbonated water is added. The 16-oz. container holds enough concentrate to make 18 glasses (7 oz.) of the soft drink. Propellent is nitrous oxide and CO_2.

Corrugated Boxes

Of all the corrugated containers shown, the interest-sparkers were the triple-fluted units manufactured by Corro Ltd. (New York). These boxes are remarkably strong (a box 24 in. long and 12 in. high has withstood loads in excess of 5,000 lbs.), and have a relatively low price tag, compared with other materials necessary to do the same job of packaging. Chemical equipment manufacturers should find these boxes suitable for some of the heavy weights.

Heard of, but not seen before: a solution of the problem of obliteration of lettering on bagged and boxed material by plant dust and corrosive atmospheres. The gimmick: a spray nozzle that applies a coating of molten polyethylene over box and bag surfaces to protect lettering. Device is now being used by Ohio Boxboard and Chicago Carton.

Cartons

Just introduced in this country by Gardner Board and Carton Co. and shown publicly for the first time at the show is a system (called Hermaetet) of making cartons with a heat-sealed inner liner that is airproof, siftproof, moistureproof, odorproof and / or greaseproof, depending on type of liner used. Liners are an integral part of the carton itself—not a bag-in-a-box combination. Liners include polyethylene-coated paper, laminated aluminum foil, cellulose film, waxed glassine paper, coated aluminum foil, etc. Uses for the unit are packaging of dehydrated and powdered foods, materials with high grease content, liquids and chemicals.

Packaging machinery that is used with the system is only 9 ft. long, can handle cartons ranging in size from 2x1⅛x3⅜ in. to 3¾x2¾₁₆x6⅝ in.

Styrene and Acetate: The familiar re-usable cheese glass may become extinct if re-usable plastic containers continue to grow in popularity. At the Monsanto booth, a variety of Lustrex styrene containers for the housewife were exhibited. After being used for packaging shrimp, cottage cheese, ice cream, potato salad, etc., the containers may be converted into sherbet, champagne, and water goblets.

Another bright idea: colored disposable plastic cups for coffee vending machines. Price is said to be competitive with paper cups, and good insulating quality of the styrene container allows safe handling of hot coffee. The throwaway cups (which come in red, green, pink, yellow and white) are the harbinger of a whole line of disposable plastic dishes.

High clarity and high impact strength have been successfully combined in a new styrene molding compound introduced by Monsanto. Called Lustrex Hi-Test 88, the new material is said to reduce opacity 50% without sacrificing high impact strength usually associated with rubber-modified formulations.

Acetate seems not to have lost too much ground to some of the newer films. Seen at the show were preformed acetate packages for paint brushes, hose nozzles.

Machinery

Packaging machinery is keeping pace with development of packaging materials and, in some cases, is outdistancing them. Some of the interest-exciting equipment:

- An automatic machine for applying pressure-sensitive labels with speed —up to 60 containers/minute. Said to be first in the field, the unit is a product of New Jersey Machine Corp.
- An optical device using a rotating mirror drum to pick up the pattern of a moving web, allowing continuous checking of color register. Called San-A-Web, the unit is a product of National Laboratories & Manufacturing.
- A combination automatic tablet and capsule counter, sterile vial-filling and rubber-stoppering machine, and ampul filler and sealer. This all-in-one unit is manufactured by Popper & Sons (New York).
- A machine to manufacture polyethylene bags by the side-weld method of construction. The machine is manufactured by G. T. Schjerdahl Co. (Northfield, Minn.), makes bags from 3x3 in. to 40x40 in.

And also . . .

- Tetrahedron cartons for milk. This kind of carton has seen use in Sweden, has been adopted for use (Sun Rise Dairies, New Jersey) in the U. S. The units have a polyethylene inner and outer coating. Filling and forming of the package are simulta-

DUPOR No. 4 RESPIRATOR has big double filters for easy breathing and greatest filtration! Soft rubber face mask gives airtight fit. Patented DUPOR valves bring in clean air—throw off breathed air! Weight 4 oz. Order today! Or, write for folder showing complete line of Dupor Respirators!

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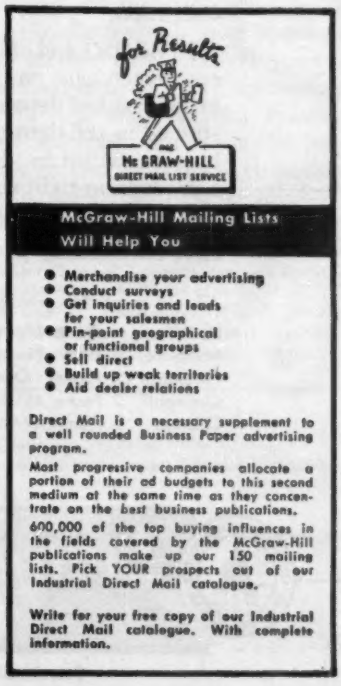
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Write for your free copy of our Industrial Direct Mail catalogue. With complete information.

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Cincinnati	2	Phone: DUnbar	1-2900
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SPECIAL STUDY—
"Look where a site is production-right"
ON REQUEST
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Baltimore & Ohio Railroad

Constantly *doing things*—better!

neous operations. Other applications for the unit are now being tested—but researchers are tight-lipped about details. Food applications are obvious, applications in chemical field may be a bulk dry product.

• Eggs in polyethylene containers. It's a curiosity now, but Packaging Industries Ltd., which showed the container, claims it should be commercially available in about a year. Eggs are removed from their shells, dropped in preformed recesses in polyethylene sheet along with inert gas. Du Pont has taken the idea a step further, has boiled eggs in a similar container made of Mylar.

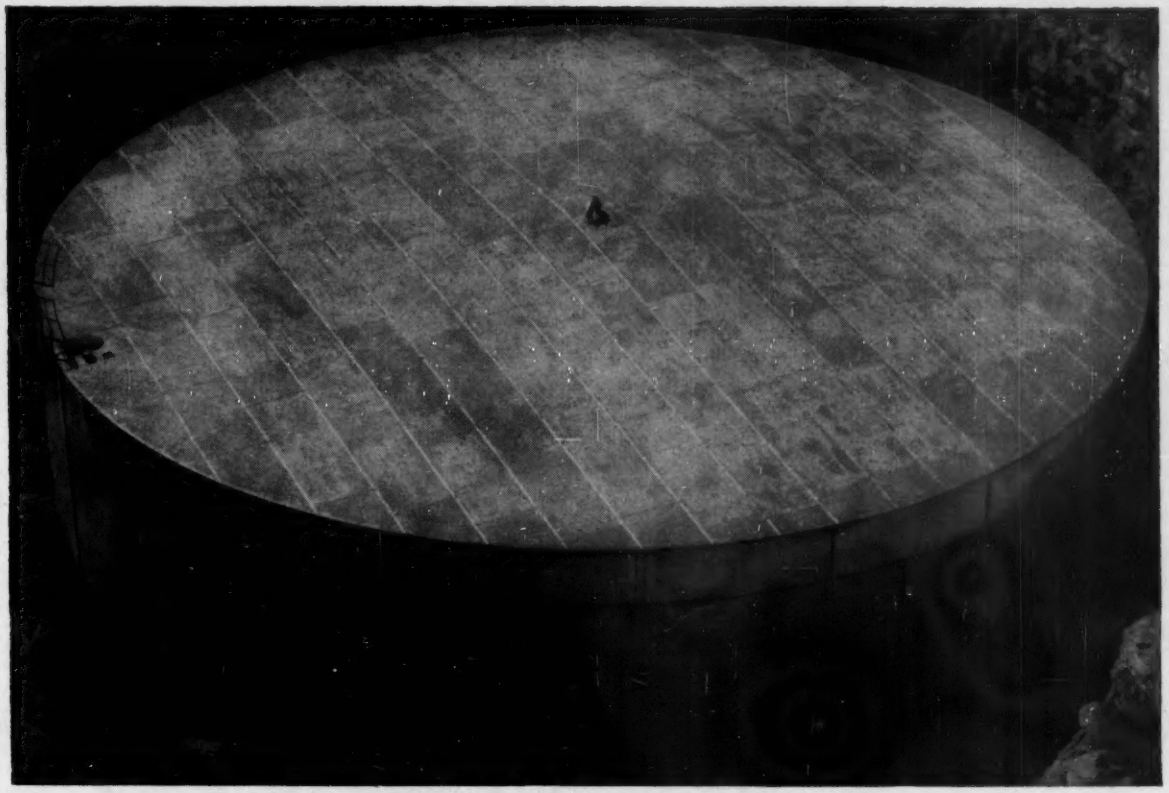
Not yet in commercial production, but probably—in light of the increased emphasis on impulse buying—not too far away, are two items that Alcoa exhibited.

One product is a foil package for precooked frozen hamburgers, which can be heated in a toaster. The other is a package containing bacon on a continuous strip of Alcoa Wrap, which is drawn from a carton like cellulose tape.

Ideas Galore: Two ideas that should find use in plant packaging lines were also displayed at the show. Bakelite operated a machine that bonds heavy-gage polyethylene together without driving heat through the sheets. The machine extrudes a filament of molten polyethylene between two sheets of polyethylene film. An almost unbreakable bond is effected. Bakelite was using 5-mil-thick polyethylene with the machine, running at speeds of approximately 400 ft./minute.

Another idea—not exactly new, but just getting public showing—is a device developed by John Schmidt, chief engineer of Crown Cork and Seal.

It's an automatic fill control unit that eliminates guesswork when adjusting for temperature variations of oils and other packaged materials in filling operations. A temperature-sensing bulb in a filler bowl actuates a drive motor connected with the filler volume adjuster. The control device relates the oil temperature in the filler to the predetermined temperature-density relationship of the product, and continuously corrects the amount of product delivered. The device can be used with almost any type of filler and costs about $2,500 installed.



Constructed entirely of Alcoa Aluminum, world's largest all-aluminum tank* stores 2⅓ million gallons of ammonium nitrate

High resistance to the corrosive action of ammonium nitrate was a big factor in choosing ALCOA Aluminum for the world's largest all-aluminum storage tank. The Mississippi River Chemical Company's primary consideration in erecting the giant tank was the need for uninterrupted storage service with a minimum of maintenance. ALCOA Aluminum's natural resistance to weathering and ammonium nitrate corrosion assured the company of long service with low maintenance costs.

ALCOA Aluminum is used extensively throughout the chemical and petroleum industries to handle many corrosive solutions. This economical metal has a proven record of long, trouble-free service in tank cars, piping, drums, prilling towers and storage tanks.

Write today for detailed information on how ALCOA Aluminum can be used effectively in your operation. Take advantage of ALCOA's more than 30 years of experience with aluminum in hundreds of applications. Send for the new, 80-page book, *Process Industries Applications of Alcoa Aluminum*. It contains the latest performance and design data on ALCOA Aluminum. Write on your company letterhead or use the coupon.

* World's largest all-aluminum storage tank at the Selma, Missouri, plant of Mississippi River Chemical Company. The tank stands 26 feet high, has a diameter of 128 feet, is constructed of more than 300,000 pounds of Alcoa Aluminum, holds 2⅓ million gallons of 83% ammonium nitrate solution. Field erected by Chicago Bridge & Iron Company, Chicago, Illinois. Designed by Fluor Corporation, Ltd., Los Angeles, California.

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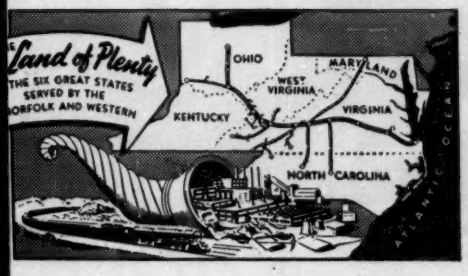
And here are typical analyses*

	DHL-1-1	DHL-1-2	DHL-1-3
SILICA (SiO_2)	.36%	.30%	.34%
IRON OXIDE (Fe_2O_3)	.072	.043	.049
ALUMINA (Al_2O_3)	.21	.20	.19
LIME (CaO)	55.00	54.90	55.40
MAGNESIA (MgO)	.65	.62	.51
SULPHUR (S)	.012	.011	.015
PHOSPHORUS (P)	.006	.006	.009
IGNITION LOSS	43.20	43.50	43.20
CALCIUM CARBONATE (Calculated)	97.90	97.72	98.51
MAGNESIUM CARBONATE (Calculated)	1.36	1.30	1.07

* Report prepared by Pittsburgh Testing Laboratories, Pittsburgh, Pa.

If you're planning a plant—it will pay you to see us. Call or write; we will respect your confidence. We would like to tell you about this valuable limestone deposit.



INDUSTRIAL AND AGRICULTURAL DEPT.
Drawer CW-710 (Phone 4-1451, Ext. 474)
Norfolk and Western Railway
ROANOKE, VIRGINIA

Norfolk and Western RAILWAY

THROUGH THE MICROSCOPE: Nematodes (left) and viruses are new weapons being turned on an old enemy . . .

They're Mounting Biological War on Bugs

Chemicals have long borne the burden of man's war against insects. But a small band of researchers is now taking a different tack, conscripting microorganisms — viruses, bacteria, fungi, protozoa, nematodes—that attack and destroy insects. Field-trial successes with the new weapons have already been scored, and there is now the very real possibility that microorganisms will supplement chemicals in insect control.

The biggest potential for microbial control is shaping up in these areas:

- On edible and forage crops where insecticide residues cause toxicity, flavor and odor problems.
- In vast forest regions where it's impractical, uneconomical to apply insecticides.
- Wherever insects are immune or developing resistance to insecticides or to natural insect parasites or predators.

Late Returns: Latest reported success in this field is the control of the Virginia pine sawfly with a virus spray. U.S. Dept. of Agriculture (Beltsville, Md.) researchers Clarence Thompson, Samson Dutky, J. V. Thompson, and J. M. Davis cultivated the virus, prepared the spray for a three-acre field trial. Eleven days after application, a 77-100% kill was observed.

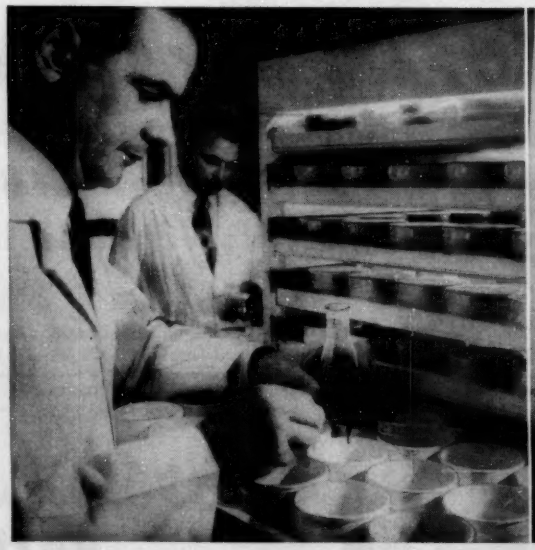
Also showing considerable promise at Beltsville is a new species of nematode (a multicellular worm) aimed at the apple-damaging codling moth. It has displayed high effectiveness when sprayed on trees, has commercial appeal because codling moth larvae are now reportedly building up resistance to DDT control methods.

Center of research in this field on the West Coast is the University of California, probably the only school in the world that gives doctoral degrees in the subject. Here, Edward Steinhaus, one of the pioneers in this field, has successfully used viruses against alfafa caterpillars, tent caterpillars, and yellow-striped army worms. Currently he's testing a virus on the California oakworm, hasn't yet come up with conclusive results.*

Steinhaus is cautiously optimistic about microbial control. "It is so new," he avers, "that we don't really know what its true potentialities are.

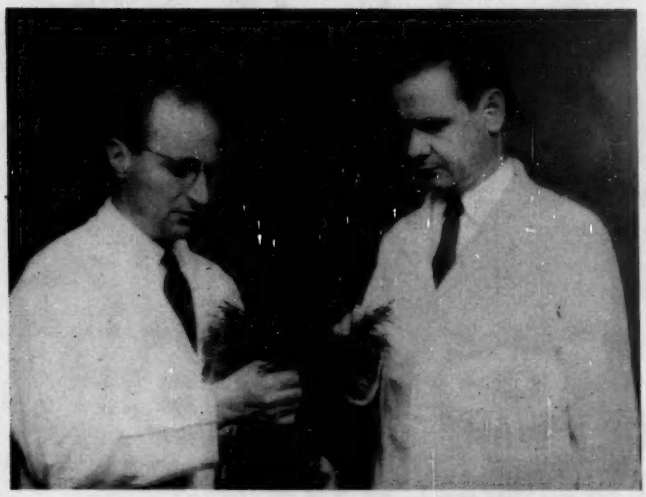
*In one California field test, several thousand acres of alfalfa were sprayed with virus. The dead caterpillars were swept up with a bulldozer, pulped to get the virus, then brewed into more spray to rid another multithousand acre plot.

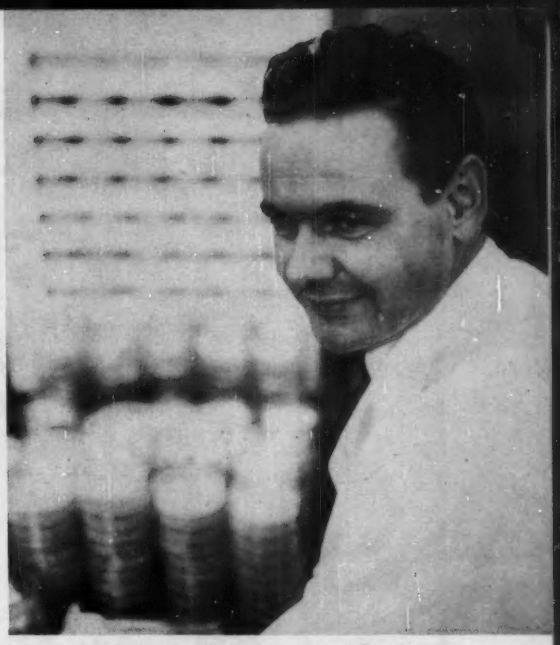
How to make an insect-killin



1 COLLECTION: Virus-containing larvae are removed from dead insects.

2 GRINDING: Larvae to get a uniform vi





USDA'S DUTKY (left) AND THOMPSON (right and above): They still the sawfly's buzz.

In any event, the commercial people may be missing a bet if they neglect to look into possible applications of viruses, bacteria, fungi, and other microbiological organisms to supplement chemical insecticides."

Canada, too, is pushing research in this new field—chiefly in an effort to conquer its pine-tree-defoliating European pine sawfly. Field tests of insecticidal viruses at Sault Ste. Marie, Ont., are said to have been highly successful in combating the pest.

Desirable Viruses: To date, the bulk of bio-insecticidal research has centered on the use of viruses. That's because they're:

- Inexpensive. Large quantities of viruses can be produced in a relatively short time with a small investment in equipment.
- Effective in small amounts (example: 5 cc/acre were used in alfalfa caterpillar field trials in California).
- Easy to apply. Can be sprayed or dusted over large areas by plane with standard spray equipment.
- Specific—attack only the target insect; apparently do not harm humans, animals, plants.
- Self-perpetuating for a season, sometimes longer. Therefore, only one treatment per year is required. A treatment that will be self-perpetuating for 5-10 years may ultimately be feasible.

irus spray . . .

mogenized in a blender pension.

3 **COUNTING: After settling out, polyhedra (virus clumps) are counted and calibrated.**

4 **BLENDING: Polyhedra are put into spray tank, diluted to concentration with water.**

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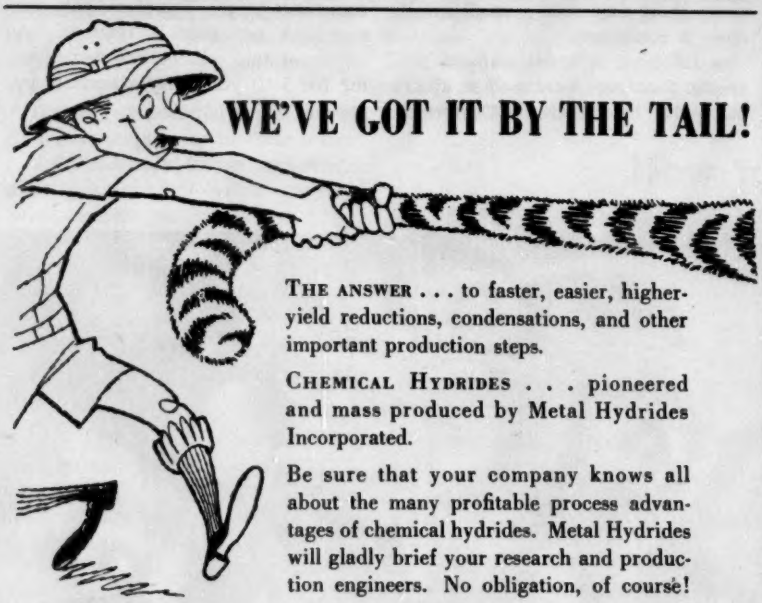

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What's more, viruses aren't harmed by insecticides, can be used in conjunction with them. And insects do not appear to grow resistant strains to viruses (as they do to insecticides).

Debits: Microbial control has drawbacks, of course, some real, some conjectural.

For one, most viruses aren't as efficient as insecticides, give about 75% effectiveness (compared with 95% or better for insecticides). That's why viruses aren't expected to replace insecticides, only supplement them (i.e., viruses could effect a 75% kill, with chemicals supplying the knockout).

Timing of the application with regard to climate is a very delicate part of control. Most viruses work best in high heat and humidity. If applied just before dry or cold weather, likelihood of an effective take is nil. That's why considerable study is still required on this phase of virus control.

Also, it's difficult to produce some viruses in quantity.

More in the realm of conjecture are these problems:

STEINHAUS: For insecticide makers, ally or threat?

Research chemists at work in Borden's newest chemical laboratory; and (below) exterior view of this ultra-modern million dollar investment in chemical progress.

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CHEMICAL DIVISION

• Possibility that insects will develop resistant strains to viruses after prolonged use.

• Microorganisms may harm plants, animals, humans. Although there's no known case where microorganisms under study have been injurious to plants and animal life, this possibility always exists.

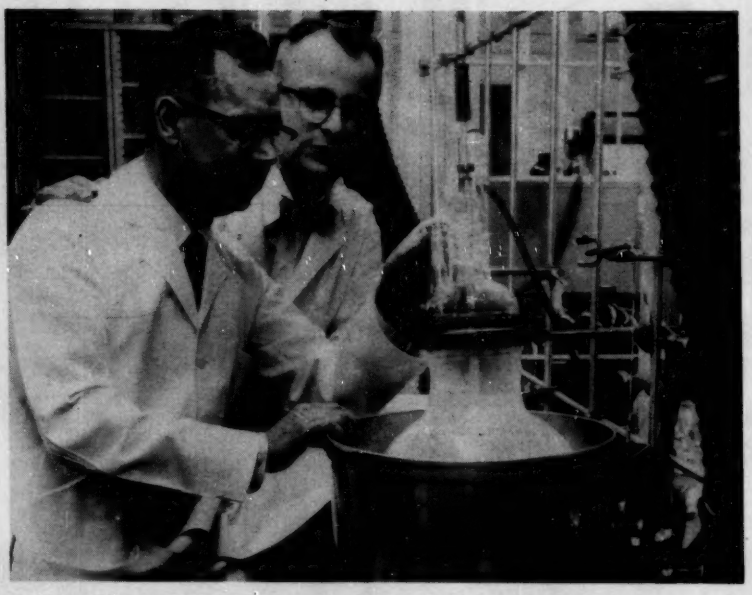
• A microorganism fatal to a given pest may also prove to be harmful to parasites and predators of that pest. Introduction of any microbes must be done in such a way as not to upset the balance of nature operating in man's favor.

Infection on Purpose: Infectious material is prepared for field distribution (*see cuts, pp. 80-81*) by mashing the diseased larvae to a thick homogeneous suspension in a mixer or blender. After diluting with water, the mash is filtered to remove large larvae particles. The suspended polyhedral bodies (virus clumps) are counted and this relatively concentrated material is then taken into the field where the final spray is made up by further dilution with water. Depending on the scale of the application, spraying methods range from ordinary hand sprayers to airplanes.

In the laboratory, insect-killing viruses may be prepared either from diseased insects or by tissue culture. But production of large quantities by tissue culture methods is not feasible. Therefore, any future large-scale virus production will probably require the rearing of insects, exposing them to the appropriate virus, then processing the infected insects.

Bio-Bullets: Viruses that kill insects have certain characteristics that distinguish them from those causing disease in plants and animals. One of these is the production of peculiar crystal-like bodies, called polyhedra, in the cells of tissues affected by viruses. A number of virus particles are contained in each polyhedra formation. This crystal enclosure protects the virus from air, keeps it alive indefinitely.

For many insects, microbial control is still thought to be impossible or impracticable. That's why it may never replace chemical or natural control methods. But, basing their conclusions on the record, biological scientists are confident that microbes will take their place beside chemicals in the battle against bugs.

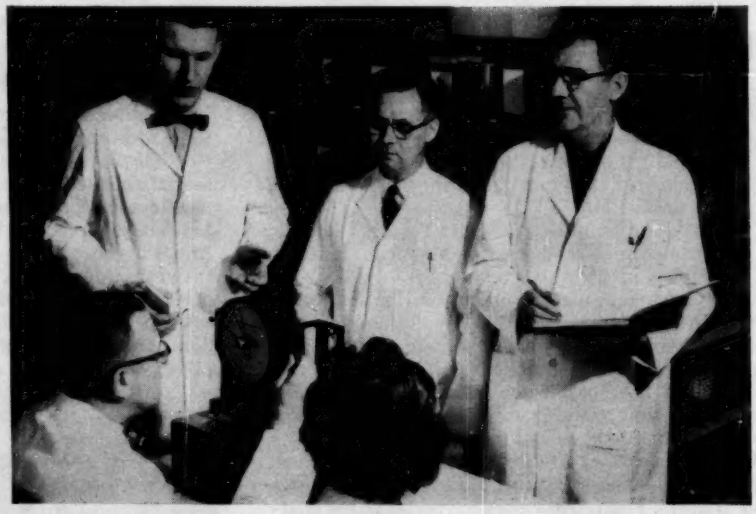


HERR AND BABCOCK: In androgen synthesis, a microbiological approach.

Newest, Strongest Hormone

This week, a new androgen (male hormone) is tendering 17-methyl testosterone its first serious challenge in 20 years. That's how long the veteran compound has been the only oral androgen used in human therapy —despite intensive research to find better compounds. The newcomer is 11-β, 17-β-dihydroxy-9-α-fluoro-17-methyl-4-androstene-3-one. Called Halotestin, it is reportedly 10 times more potent, 20 times better able to induce muscle growth than methyl testosterone in animal studies.

Synthesized and evaluated by Upjohn (Kalamazoo) researchers, Halotestin is now undergoing clinical trials. It is said to look promising, be relatively free of undesirable side effects. Upjohn's team—which included chemists Milton Herr and John Babcock, biologists Stanley Lyster and Robert



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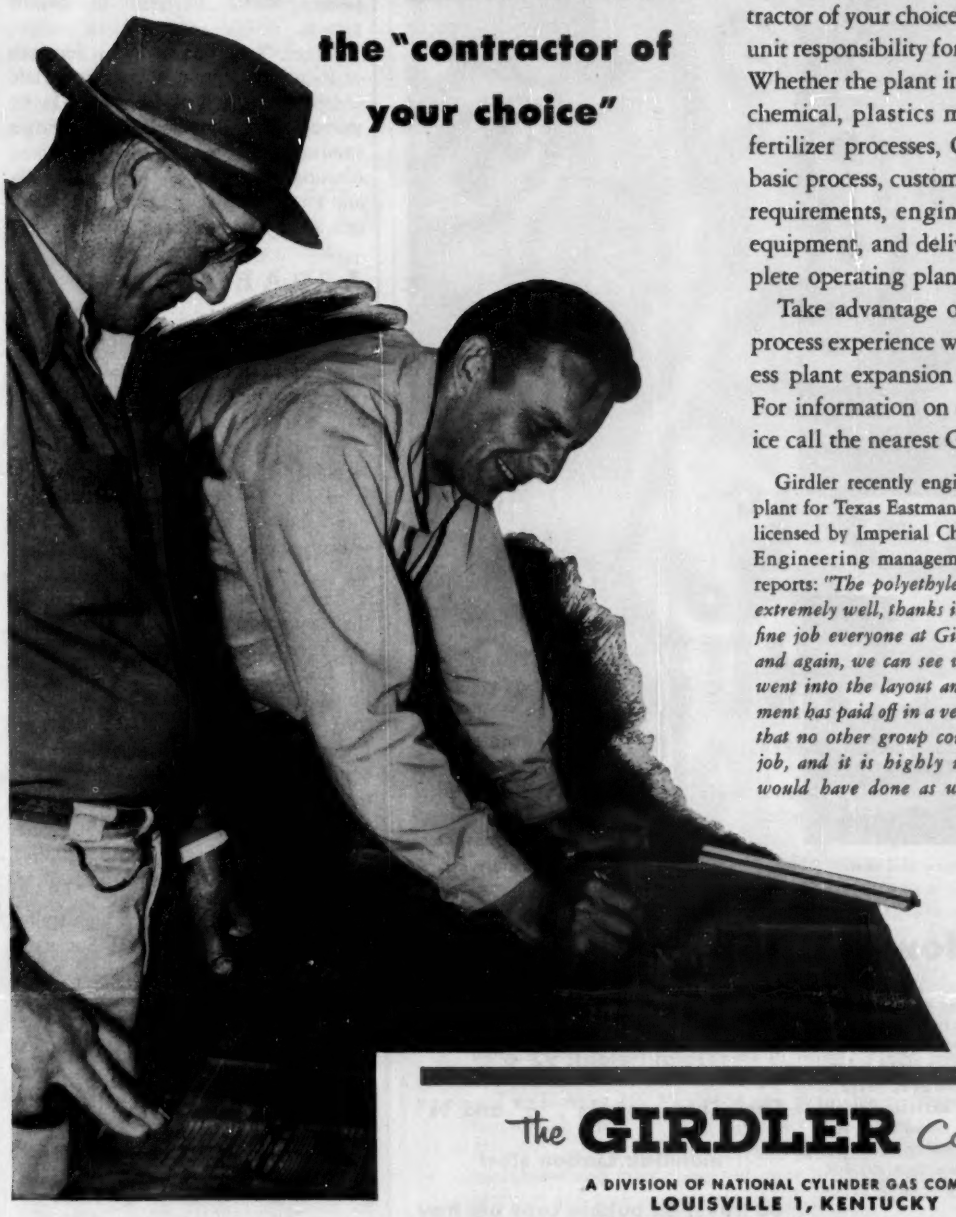

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Girdler recently engineered a polyethylene plant for Texas Eastman Company to a process licensed by Imperial Chemical Industries Ltd. Engineering management of Texas Eastman reports: *"The polyethylene plant has operated extremely well, thanks in large part to the very fine job everyone at Girdler did for us. Time and again, we can see where the thought that went into the layout and piping up of equipment has paid off in a very large way. We know that no other group could have done a better job, and it is highly unlikely that anyone would have done as well by us as Girdler".*

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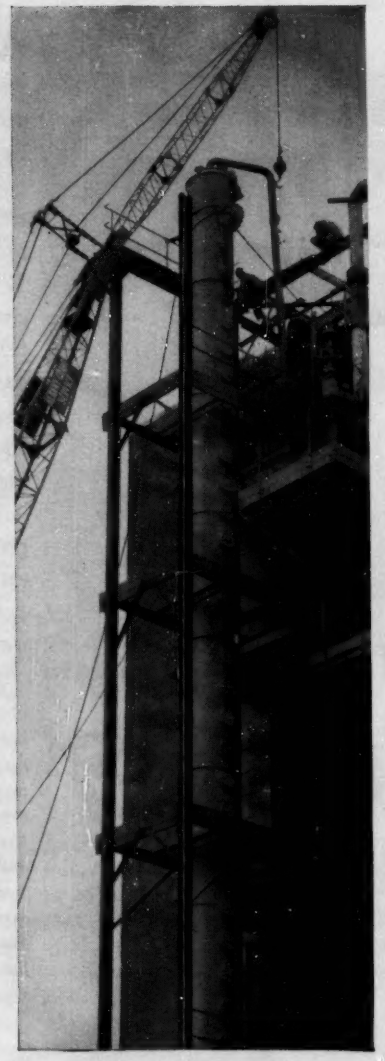

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RESEARCH . . . . .

Stafford—also turned up a related steroid: 11-β, 17-β-dihydroxy-17-methyl-4-androstene-3-one. It is said to be equal to methyl testosterone in androgen effect, has three times the latter's ability to promote muscle growth.

Upjohn's starting materials for both of its new compounds are appropriate C-19 steroids hydroxylated at C-11 by microbiological methods. But the firm's synthesis achievement is a mixed blessing. Along with Abbott, Eli Lilly and Parke, Davis (and others), Upjohn is a methyl testosterone supplier.

APPARATUS . . . . .

Versatile Mixer: Manton-Gaulin Manufacturing Co. (Everett, Mass.) offers a new Gaulin Laboratory homogenizer that reportedly can handle over 65 different types of food and chemical materials, ranging from fluid to highly abrasive. Key to its versatility is said to be in a specially designed one- and two-stage homogenizing valve assembly.

•

Even Oven: An oven that stabilizes the temperature of a quartz crystal for precise oscillator frequency control has just been developed by the National Bureau of Standards (Washington). The oven utilizes the heat of fusion of highly purified *p*-dibromobenzene, reportedly holds its temperature to within 0.01 degree of a standard temperature of 87.31 C.

DRUGS . . . . . .

Among the drug research high spots of the American Chemical Society's 129th national meeting (Dallas) were these new developments:

• D.O.N. (6-diazo-5-oxo-L-norleucine) was reported to be 50-80 times as effective as azaserine in controlling the mouse tumor sarcoma 180. Apparently more toxic than azaserine, the compound is nonetheless held to be a valuable tool for cancer research. D.O.N.'s development is the result of a cooperative project between Sloan-Kettering Institute for Cancer Research (New York); Mellon Institute (Pittsburgh), and Parke, Davis and Co. (Detroit). Parke, Davis also figured in the discovery of azaserine (*CW, March 27, '54, p. 62*).

• Pfizer's (Brooklyn) S. K. Figdor disclosed synthesis of new steroid anesthetics similar to the firm's Via-

dril (*CW, June 4, '55, p. 64*). The new agents have been tested on laboratory animals only.

• Hoffmann La Roche, Inc. (Nutley, N.J.) unveiled substituted carbamylmethyl-benzyl-dialkylammonium halides as promising agents against pinworm infections.

• Synthesis and testing of diaminoalkanes for possible use against sleeping sickness was described by Abbott Laboratories (North Chicago, Ill.) researcher R. U. Schock.

•

Peace Maker: Pfizer's new tranquilizer product, Atarax (*CW Technology Newsletter, April* 14) is 1-*p*-chlorobenzhydryl - 4, 2 - (2 - hydroxyethoxy) ethyldiethylenediamine hydrochloride.

It has shown promise in Europe as a less toxic substitute for chlorpromazine.

•

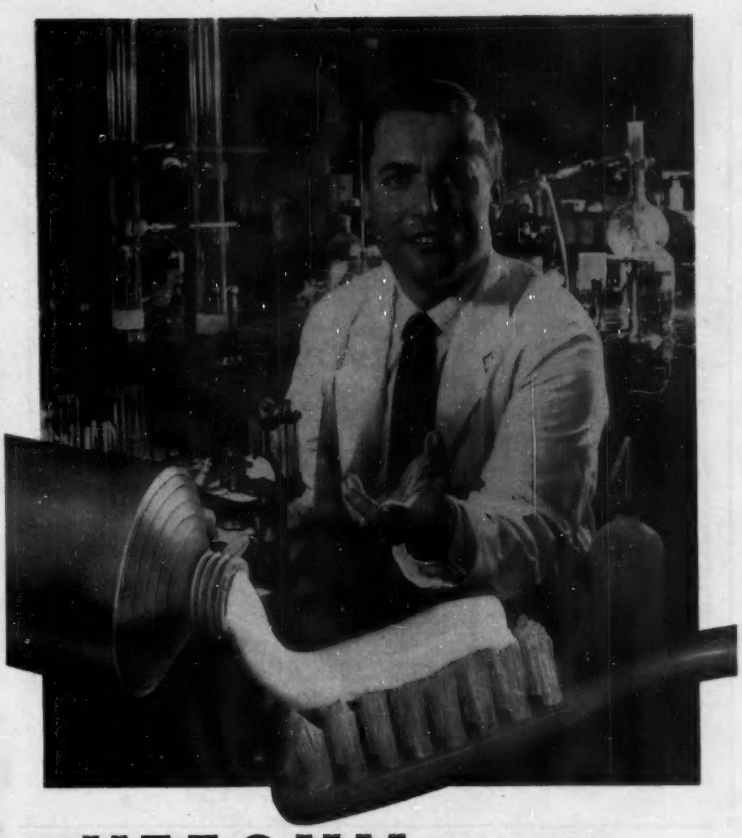
Hypotensives: New research at the Wellcome Research Laboratories in Kent, England, has turned up blood-pressure reducing properties in diquaternary-amino-carbinols. They're structurally related to the large group of tertiary and quaternary amines of the benzhydrylalkyl type that have already yielded a number of clinically useful drugs.

LITERATURE . . . . .

Literature in the news this week:

• Answers to what happens when a university researcher turns up something useful for the drug industry can be found in a new 69-page monograph from the National Academy of Sciences-National Research Council. The pamphlet analyzes policies and practices, procedures and experiences in the handling of patentable research results. It concentrates on discoveries and inventions of a medical, pharmaceutical, therapeutic or hygienic nature in the 90 approved medical schools and 74 accredited colleges of pharmacy in the U.S. and Canada. It's No. 375 in the NAS-NRC series, can be ordered from the Office of Patent Policy Survey, 2101 Constitution Ave., N. W., Washington 25, D.C. Price: $2.

• Another recent publication in the same series (No. 372) gives a rundown on the structure of 104 nonprofit research institutes and patent management agencies. Included: their affiliations, objectives, operating procedures, research and patent policies, experi-



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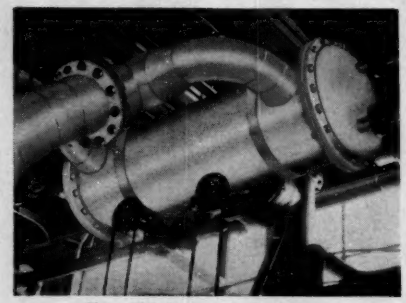

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RESEARCH . . . . . .

ence with research and patent management problems, and excerpts from their articles of incorporation. Price: $3.

• One answer to U.S. scientists' complaints about the shortage of facilities to translate foreign technical journals is a new Commerce Dept. publication called "Technical Digests." The 140-page monthly summarizes outstanding articles from European journals, is available from Mission Publications Office, 2000 P St. N. W., Washington 6, D.C. Price: $24/year, or $2.50/copy.

• In a similar vein, Associated Technical Services (East Orange, N.J.) offers English translations of a new Russian journal, "Atomic Energy." The Soviet journal will cover new developments in peaceful atomic energy uses (e.g., atomic physics, power generation, raw materials, radioisotopes, and safety). It's to appear six times/year. Price of the translations: $85/year.

• Barnebey-Cheney Co. (Columbus, O.) has a new technical bulletin on the use of activated charcoals and carbons in the laboratory. Designated E-1617, the brochure covers characteristics of both general and special-use types of charcoal, lists 30 laboratory applications.

• "Catalog of Pilot Plant Products" is the name of Baker Castor Oil Co.'s (New York) new booklet describing 40 pilot-plant-stage castor oil products. Properties and suggested applications of the compounds are listed.

• A new reference table of Beckman spectrophotometric absorption cells and cell compartment assemblies is available from Will Corp. (Rochester, N.Y.). Forty absorption cells, including micro cells as well as all Beckman cell compartment assemblies for both its spectrophotometer models DU and B, are listed.

• Harry W. Dietert Co. (Detroit) has a new catalog on moisture determination equipment. It illustrates and describes items required for analyzing moisture content in solids, liquids, granules or semiliquid materials.

• Determining carbon dioxide in water by conductivity measurements is the subject of a recent technical paper (No. 133) by W.H. & L.D. Betz (Philadelphia). The method applies to analysis of waterside deposits, waste treatment chemicals and organic carbon in water.

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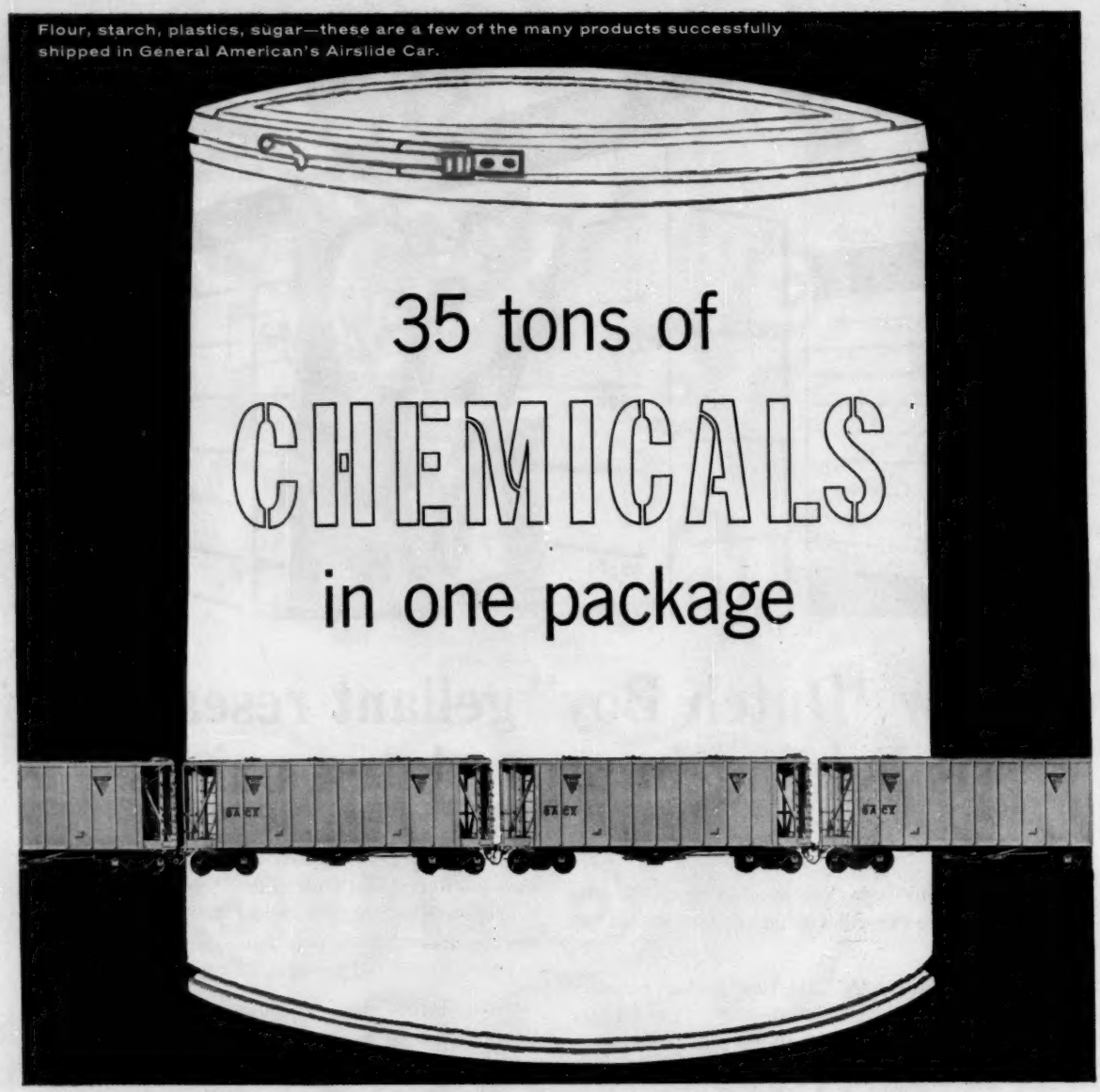

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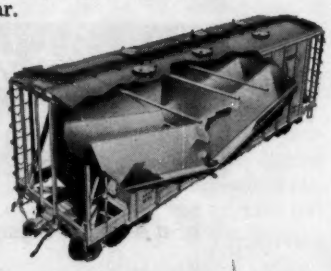

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CHEMICAL WEEK
April 21, 1956

New twists in the fluorspar tangle keep cropping up, and this week there's more on the relative costs of imported and domestic acid-grade spar.

Spokesmen close to—and sympathetic with—domestic fluorspar producers have been doing a lot of talking about the $35/ton price of import material, compared with the $47.50/ton (f.o.b. Rosiclare, Ill.) charged for domestic product (*CW Market Newsletter, March 31*). This comparison obviously bolsters "hike-the-tariffs" arguments by domestic producers, and is correct—up to a point.

But it's not the whole story. The Bureau of Mines says the only available $35/ton acid-grade fluorspar comes from Mexico; furthermore, the price (at the U.S. border) is only rumor—there are no official quotes. The bargain price for Mexican spar is attributed to low labor costs, relatively high-grade deposits.

It's probable, however, that very little Mexican material is moving to East Coast consumers; and European material—despite a higher price—is more competitive with the domestic product. European spar is now quoted at $50 to $52.50/ton, c.i.f., duty paid at port of entry; but this does not include a drying charge, which would hike the price another dollar or more.

But note, too, that the freight charge on domestic spar, from Rosiclare to the East Coast, is about $20/ton.

Just how much fluorspar is coming from Mexico? According to the government's preliminary figures for '55, Mexico accounted for 75,000 tons of a total 214,000 tons imported by the U.S. Domestic output added another 160,000 tons to the nation's total supply.

However, imports from Mexico—though still relatively small—are growing, give domestic producers plenty to think about. Mexican spar is now reportedly finding a market in the Midwest; but there's talk that it is—or soon may be—shipped to the East Coast by water, which may well make it the lowest-cost fluorspar that could be delivered at Eastern points of consumption.

•

Will there be an ammonia glut in the West by next year? More and more marketers seem to think so.

The latest such prediction is by Union Oil's senior vice-president, W. L. Stewart, who last week had this to say at the firm's annual stockholders' meeting: "Our analyses of market trends tells us that the chemical industry in the Western area of the U.S. in 1957 will be producing substantially more ammonia than the area consumes. We are presently engaged in finding new markets for ammonia in Mexico, South America, and the Orient. We are also expanding the Brea plant's capacity to convert ammonia into ammonium nitrate."

His statement emphasizes a recent warning (*CW Business Newsletter, March 31*) by Shell Chemical's former president, Jan Oostermeyer, who called Arizona "a dumping ground for marginal ammonia," doubted the wisdom of building new plants in that state—and by implication, anywhere in the Southwest.

•

Here's a rundown on the February output of 11 major chemicals:

Compared with the January turnout, 10 items were on the downside, with hydrochloric acid showing the greatest dip; only calcium carbide climbed, overcame the handicap of the short calendar month.

Preliminary production figures for February, as reported by the Bureau of Census (in short tons and showing percent of decline):

Synthetic anhydrous ammonia, 275,121 (1%); ammonium nitrate, 200,198 (5%); chlorine gas, 303,052 (5%); hydrochloric acid, 74,940 (8%); nitric acid, 209,244 (3%); phosphoric acid, 313,691 (5%); soda ash, 416,418 (3%); electrolytic caustic soda, 303,945 (4%); caustic soda (lime soda process), 37,406 (7%); sulfuric acid, 1,352,795 (6%).

But carbide production hit 91,550 tons for a 10% gain.

•

West German plastics production soared to a record high of 425,000 tons in '55, 28% above the '54 output.

Polymerization products climbed most—30%—to 200,000 tons; the boom was primarily due to increased polyvinyl chloride output, but important, too, was a bigger turnout of polyolefins—especially polyethylene, which was up 100%. Acrylate and methacrylate production increased 44%.

Condensation products were 27% higher than in '54, totaled 174,000 tons. Biggest increases were in output of technical resins, molded plastics and varnish artificial resins; polyamides and polyurethane were next.

Cellulose derivatives rose 15%, hit 50,600 tons. Last year's expansion of cellophane capacity and greater output of cellulose ether were main contributors.

Where is West Germany's expanded plastics output going? Part of the answer: plastics exports climbed 40% in '55.

•

Ready to go, a monomethyl styrene plant—first phase of American Cyanamid's multimillion-dollar expansion project at Fortier, La. (*see p. 21*). Output will go into thermoplastic molding compounds.

•

Polystyrene prices are up. A 1½¢/lb. increase announced by Dow Chemical is blamed on recent freight increases and "increased labor costs."

•

And here's a cool idea for plastics users. In an effort to boost sales of French coffee ice cream, the Bresler Ice Cream Co. (Chicago) began marketing its product in re-usable polystyrene containers fitted with polyethylene covers. The result: sales doubled in just two months.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending April 16, 1956

	Change	New Price
UP		
Blood, dried, high-grade, ungnd, 16-17% ammonia, bgs., Chicago, ton	$ 4.75	$ 0.25
Tallow, inedible, extra, tks., dlvd.	0.0725	0.0012
DOWN		
Potassium stannate, dms., frt. alld. E.	$ 0.701	0.004
Sodium stannate, dms., wks., frt. alld. E.	0.571	0.004
Stannic chloride, anhyd., dms., wks.	0.785	0.005
Stannous sulfate, dms., wks.	0.964	0.006

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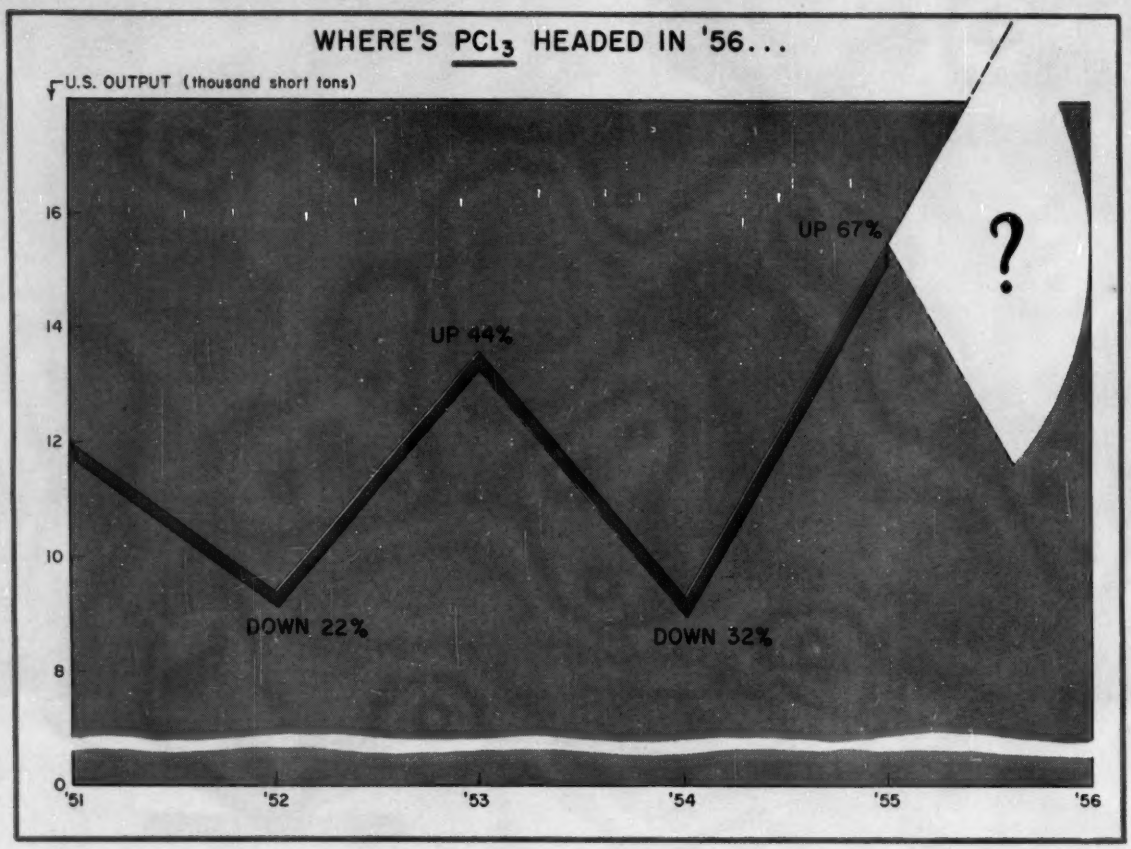

Steadier Future for Phosphorus Trichloride?

Phosphorus trichloride's skittish half-decade production curve—which reached a climax in 1955, with a startling 67% jump (over 1954) to a record high of some 31 million lbs.—provides a poser for chemical marketers.

The question: What will happen to PCl_3 output in '56? The paradoxical answer: continuing steady growth.

The erratic ups and downs of trichloride production—which seemingly belie the idea of orderly expansion—merely reflect the industry's reactions to the impact of two independent events, one in '52, the other in '54.

During '52, production tumbled to 9,400 short tons, a 22% drop from the previous year's turnout of 12,000 tons; by the end of '53, however, output had climbed a full 44% to a new high of over 13,500 tons.

What happened? The same thing that happened to many other industries during that year. In the spring of '52, general business conditions wavered, slipped to a low by midsummer, recovered by the end of the year. In brief, business slumped, and phosphorus trichloride production slumped with it.

But the chemical's second drop, just two years later, was a different matter. Over-all business conditions in '54 slipped again, it's true, and no doubt had some effect on phosphorus trichloride production; but many PCl_3 makers consider this a minor factor, give another reason for production cutbacks in their own industry.

What depressed PCl_3 production this time was a move by the Army Chemical Corps to dump several thousand tons of impure phosphorus oxychloride on the commercial market.

That amount—slated for disposal over a period of two or three months—reportedly was greater than the industry normally would have turned out in the same period (*CW Market Newsletter, July 3, '54*).

Since a large part of PCl_3 production each year goes into the manufacture of phosphorus oxychloride (itself an important intermediate in the manufacture of other chemicals), phosphorus trichloride output for '54 had to be curtailed.

By the beginning of '55, however, all the government oxychloride had been disposed of, and full commercial production of PCl_3 resumed—with added impetus. From the low of about 9,300 tons in '54, output zoomed some 67% to last year's high of nearly 15,500 tons.

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LOWER PRODUCTION COSTS are possible because compounds containing Kronitex are rapid fluxing. In laboratory fluxing tests when a compound of polyvinyl chloride resin and 63 parts per hundred resin of Kronitex were run @ 310°F. the fluxing time was only about half that of a compound containing dioctyl phthalate. The fluxing time of any slow fluxing compound can be reduced by including Kronitex in the formulation.

An evaluation of one of the four types of KRONITEX manufactured by Ohio-Apex may bring about a solution to many of your present floor tile problems.

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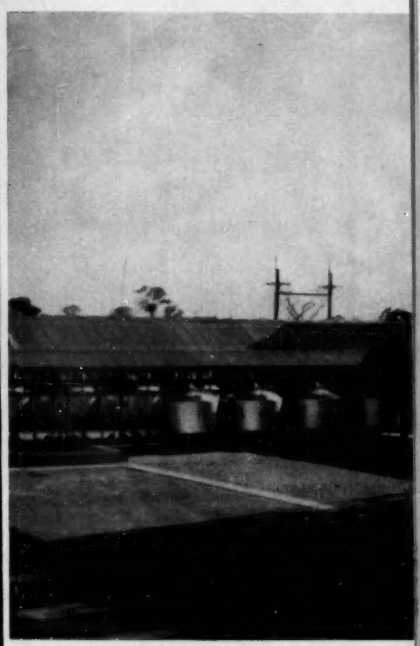
phosphorus trichloride business create the off-hand impression that the industry is capricious and unstable. But though such setbacks aren't welcome, they have posed no serious long-term threats; in each case the industry was able to recover quickly.

Actually, a more realistic picture of the over-all progress being made in the business is obtained by considering the alternate years of '51, '53 and '55 (*see chart*); they indicate a steady and substantial—albeit not spectacular—record of gains during the past five years.

And the outlook for this year is more of the same steady growth. Consensus of PCl_3 makers* is that no violent disruptions of production will occur; nor is there reason to expect

*Four producers now make most or all of U.S. PCl_3: Ohio-Apex (Division of Food Machinery and Chemical); Oldbury Electro-Chemical; Monsanto; and Victor Chemical Works.



One . . . Two . . .

GULF SULPHUR'S subsidiary, Compania de Azufre Veracruz—the third major sulfur company to go on-stream on the Isthmus of Tehuantepec—is now testing its $4-million plant; production will follow in a few weeks.

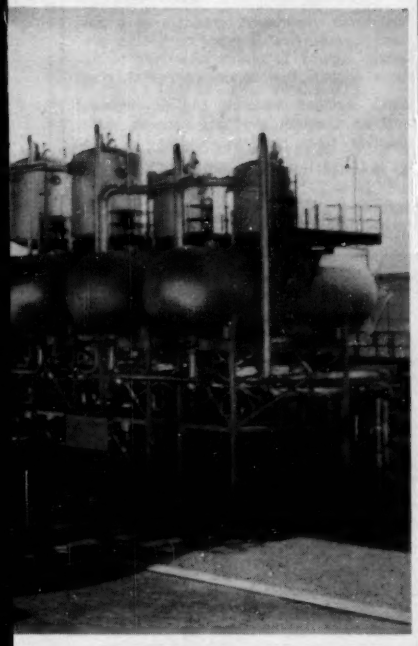
much more than a healthy increase over the '55 output.

Chances are that output will climb a modest 7-8%, perhaps even 10%; in the latter event, turnout for '56 might hit about 17,000 tons.

Oxy Stepping-Stone: Any attempt to ferret out the end-uses of phosphorus trichloride must take into consideration phosphorus oxychloride, which, to a large degree, determines demand for PCl_3.

One important outlet for the oxychloride is, of course, the manufacture of tricresyl phosphate (TCP), an important plasticizer.

But other uses for TCP are growing, too, and point to expanding demands for phosphorus oxychloride; hence the need for more PCl_3. Already familiar is the use of TCP as a gasoline additive, an outlet which, in '54, consumed about 2 million lbs. of the chemical;



Three . . . Testing

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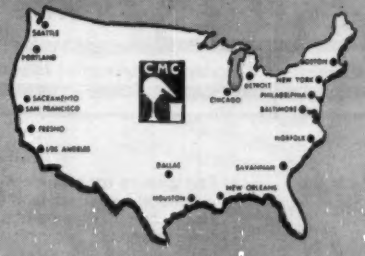

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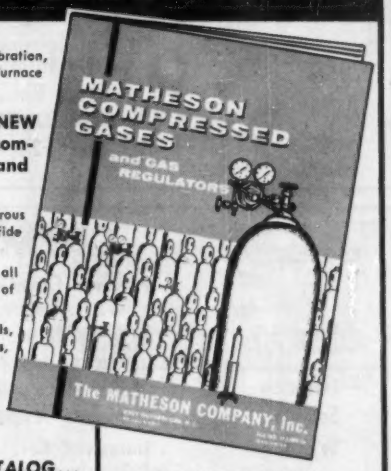

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and one "guesstimate" places the '55 demand for this purpose at 4 million lbs. or more.

Other applications—not so well publicized—include the manufacture of special lubricating fluids (as for air compressors, to cut fire hazards sometimes troublesome with oil lubes) and the manufacture of safety-type hydraulic fluids (e.g., those now used in the elevators of aircraft carriers).

All in all, these and other needs for TCP boosted its production, in '55, to well over 28 million lbs., a near-19% increase over the '54 output.

Consequently, TCP has become a major factor in PCl_3 consumption; the '55 output of tricresyl phosphate, for example, indirectly accounted for some 6,500 tons of phosphorus trichloride—42% of the total production of PCl_3 last year.

However, a still larger part of total phosphorus trichloride output goes into the manufacture of dyestuffs; although accurate figures are not available, trade consensus is that dyestuff manufacture last year took over 7,000 tons, or about 46% of all phosphorus trichloride produced.

The remaining 12% of PCl_3 (about 1,800 tons) last year went into a host of miscellaneous applications, e.g., the manufacture of phosphorus pentoxide, various phosphates and phosphites, organic acid chlorides; in addition, PCl_3 is used directly as a chlorinating agent, and as a catalyst (chlorine carrier) in the chlorination of organic compounds.

Although the phosphorus trichloride business has been pushed around a bit during the past few years, it's now evidently on a firm footing and enjoying comfortable growth.

CHEMICAL WEEK • ADVERTISERS INDEX

April 21, 1956

AIR PRODUCTS, INC. 15
Agency-Thoma & Gill, Adv.

ALUMINUM CO. OF AMERICA 77
Agency-Ketchum, MacLeod & Grove Inc.

AMERICAN HARD RUBBER CO. 34
Agency-W. L. Towne Adv.

AMERICAN MINERAL SPIRITS CO. 12
Agency-Leo Burnett Co., Inc.

AMERICAN POTASH & CHEMICAL CORP. 57
Agency-The McCarty Co.

BADGER MANUFACTURING CO. 54
Agency-F. P. Walther Jr. & Assoc.

BALTIMORE & OHIO RAILROAD 76
Agency-Richard A. Foley Adv.

BARRETT DIV., ALLIED CHEMICAL & DYE CORP. 31
Agency-McCann-Erickson, Inc.

BLAW-KNOX CO. 43
Agency-Ketchum, MacLeod & Grove, Inc.

BLOCKSON CHEMICAL CO. 40
Agency-William Balsam, Adv.

BORDEN CO., THE CHEMICAL DIV. 83
Agency-Fuller & Smith & Ross, Inc.

CARBIDE & CARBON CHEMICALS CO., DIV. OF UNION CARBIDE & CARBON CORP. ..... 4th Cover
Agency-J. M. Mathes, Inc.

CELANESE CORP. OF AMERICA 62-63
Agency-Ellington & Co., Inc.

CHEMICAL MANUFACTURING CO. 97
Agency-The House of J. Hayden Twiss

CHICAGO BRIDGE & IRON CO. 56
Agency-Russell T. Gray, Inc.

COLUMBIA SOUTHERN CHEMICAL CORP. 35
Agency-Ketchum, MacLeod & Grove, Inc.

COMMERCIAL SOLVENTS CORP. 3
Agency-Fuller & Smith & Ross, Inc.

CONTINENTAL CAN CO. 39
Agency-Batten, Barton, Durstine & Osborn, Inc.

COVER, H. S. 75
Agency-Jerry Bryant, Adv.

CREAM CITY BOILER CO. 88
Agency-Cormack-Imse-Beaumont, Inc.

DAY CO., INC., THE J. H. 36
Agency-Strauchen & McKim, Adv.

DICALITE DIV., GREAT LAKES CARBON CORP. 13
Agency-Darwin H. Clark Co.

DISTILLATION PRODUCTS INDUSTRIES, DIV. OF EASTMAN KODAK CO. 5
Agency-Charles L. Rumrill & Co., Inc.

DOWNINGTON IRON WORKS, INC. 86
Agency-The Buchen Co.

DRACCO CORP., THE 24
Agency-The Jayme Organization, Inc.

ESSO STANDARD OIL CO. 61
Agency-McCann-Erickson, Inc.

GENERAL AMERICAN TRANSPORTATION CORP., AIRSLIDE CARS DIV. 90
Agency-Weiss & Geller, Inc.

GENERAL AMERICAN TRANSPORTATION CORP., TERMINAL DIV. 4
Agency-Weiss & Geller, Inc.

GIRDLER CO., THE 85
Agency-The Griswold-Eshleman Co.

GLYCO PRODUCTS CO., INC. 14
Agency-G. M. Basford Co.

HALL CO., THE C. P. 30
Agency-Cruttenden & Eger, Assoc.

HERCULES POWDER CO. 53
Agency-Fuller & Smith & Ross, Inc.

HINDE & DAUCH PAPER CO. 95
Agency-Howard Swink Adv.

INDOIL CHEMICAL CO. 55
Agency-D'Arcy Adv. Co.

INLAND STEEL CONTAINER CO. 23
Agency-Weiss & Geller, Inc.

KELCO CO. 38
Agency-Cayton, Inc., Adv.

KELLOGG CO., THE M. W. 3rd Cover
Agency-Fuller & Smith & Ross, Inc.

KOPPERS CO., INC. 2
Agency-Batten, Barton, Durstine & Osborn, Inc.

MALLINCKRODT CHEMICAL WORKS 6-7
Agency-Smith & Williams Adv., Inc.

MATHESON CO., THE 97
Agency-Firestone Adv. Agency

MAYWOOD CHEMICAL WORKS 88
Agency-Charles W. Curtz Co.

METAL HYDRIDES, INC. 82
Agency-Creamer-Trowbridge Co.

MINERALS & CHEMICALS CORP. OF AMERICA 47
Agency-Richardson, Thomas & Bushman, Inc.

MORTON SALT CO. 1
Agency-Needham, Louis & Brorby, Inc.

MUTUAL CHEMICAL DIV., ALLIED CHEMICAL & DYE CORP. 11
Agency-The House of J. Hayden Twiss

NATIONAL LEAD CO. 89
Agency-Marschalk & Pratt Co., Inc.

NEVILLE CHEMICAL CO. 93
Agency-Bond & Starr, Inc.

NIAGARA ALKALI CO. 33
Agency-Hazard Adv. Co.

NITROGEN DIV., ALLIED CHEMICAL & DYE CORP. 8
Agency-G. M. Basford Co.

NORFOLK & WESTERN RAILWAY CO. 78-79
Agency-Houck & Co., Inc.

OHIO APEX DIV. OF FOOD MACHINERY & CHEMICAL CORP. 96
Agency-Advertising, Inc.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. 27
Agency-Downing Industrial Adv., Inc.

PETRO-TEX CHEMICAL CORP., DIV. OF FOOD MACHINERY & CHEMICAL CORP. 58
Agency-James J. McMahon, Inc.

PFAUDLER CO., THE 16-17
Agency-Charles L. Rumrill & Co., Inc.

PFIZER & CO., INC., CHAS. 67
Agency-MacManus, John & Adams, Inc.

REICHHOLD CHEMICALS, INC. 44-45
Agency-MacManus, John & Adams, Inc.

ROHM & HAAS CO. 51
Agency-Arndt, Preston, Chapin, Lamb & Keen, Inc.

SHARPLES CHEMICALS, INC. 60
Agency-Sommers-Davis, Inc.

SHELL OIL CO. 49
Agency-J. Walter Thompson Co.

SOLVAY PROCESS DIV., ALLIED CHEMICAL & DYE CORP. 2nd Cover
Agency-Atherton & Currier, Inc.

SOUTHERN STATES IRON ROOFING CO. 52
Agency-George & Glover, Inc.

TENNESSEE PRODUCTS & CHEMICAL CORP. 32
Agency-The Griswold-Eshleman Co.

U. S. POTASH CO. 82
Agency-McCann-Erickson, Inc.

VANDERBILT CO., THE R. T. 87
Agency-P. S. Advertising, Inc.

WYANDOTTE CHEMICAL CORP. 37
Agency-Brooke, Smith, French & Dorrance, Inc.

tracers SECTION
(Classified Advertising)
F. J. Eberle, Business Mgr.

CHEMICALS: Offered/Wanted 99
EMPLOYMENT ..... 98 & 99
EQUIPMENT: Used/Surplus New For Sale 99
WANTED 99
MANAGEMENT SERVICES 99
SPECIAL SERVICES 99

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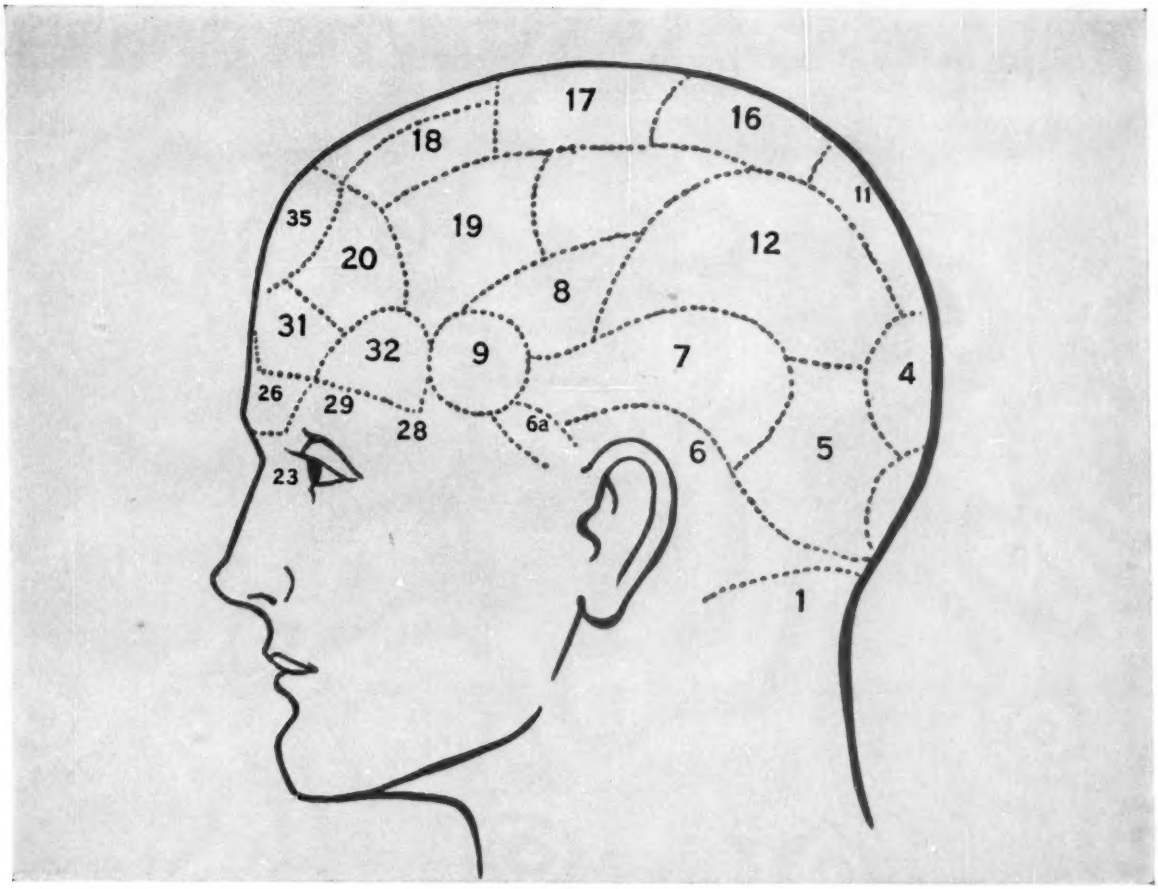

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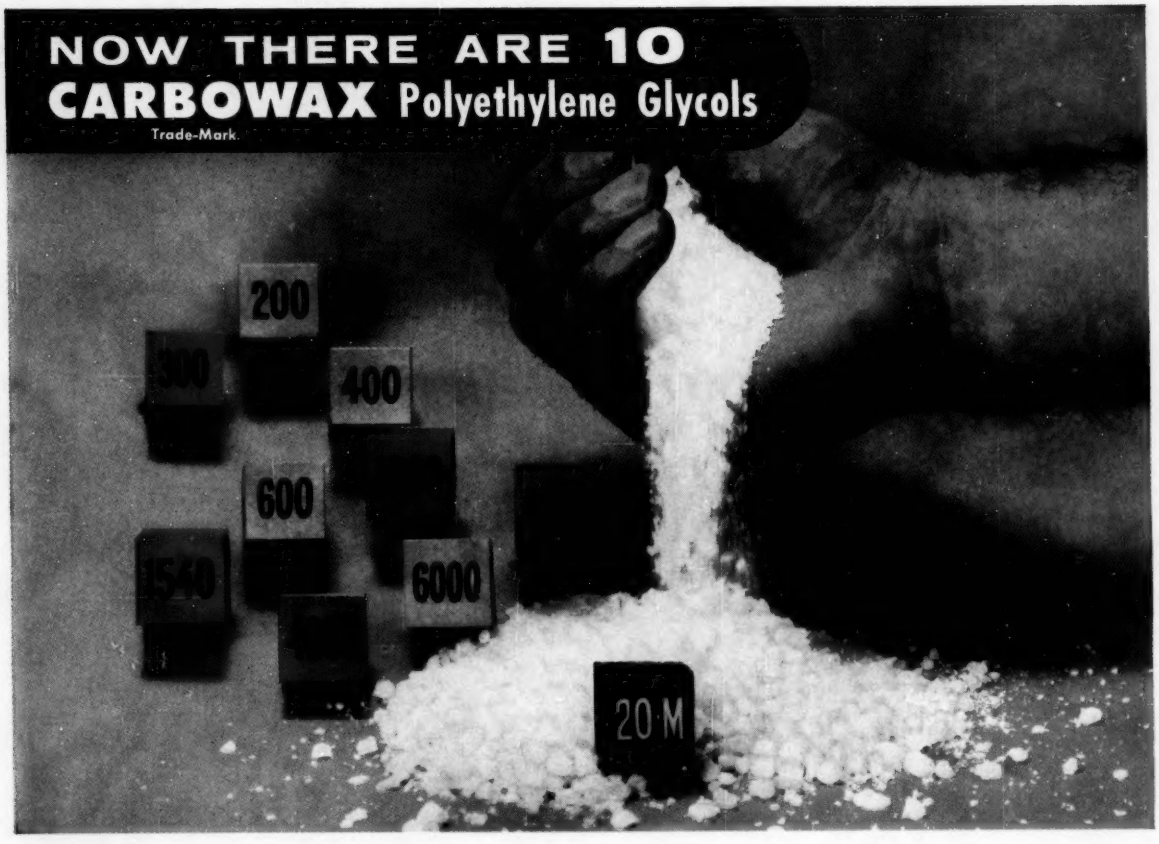

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